National Round Table on the Environment and the Economy | Table ronde nationale sur l'environnement et l'économie

Response of the National Round Table on the Environment and the Economy to its Obligations under the *Kyoto Protocol Implementation Act*

July 2009

National Round Table on the Environment and the Economy | Table ronde nationale sur l'environnement et l'économie

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TRANSMITTAL LETTER FROM THE CHAIR AND PRESIDENT AND CEO

July 2009

Dear Minister:

The National Round Table on the Environment and the Economy (NRTEE) is pleased to submit to you its third response to its obligations under the *Kyoto Protocol Implementation Act* (KPIA) with respect to the government's 2009 Climate Change Plan and Statement.

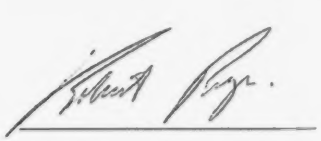
In carrying out its statutory obligations, the NRTEE has undertaken research, gathered information, and produced a written response as required. This activity focused on addressing Subsections 10(1)(b)(i) and 10(1)(b)(ii) of the Act. As allowed for under Subsection 10(1)(b)(iii), the Round Table has also reviewed and commented upon broader aspects of the issue as it relates to the government's Plan and Statement.

With this document, the NRTEE has fulfilled the filing requirements of Section 10 of the *Kyoto Protocol Implementation Act.*

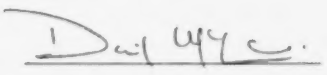
We wish to thank officials of Environment Canada, Natural Resources Canada, Transport Canada, and the Commissioner of Environment and Sustainable Development for their cooperation in providing information that we used in the preparation of this response.

We hope this document will be useful to you, the government, and Parliament in considering climate change policies and greenhouse gas emission reductions.

Yours sincerely,



Robert Page, Ph.D.
Chair



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NATIONAL ROUND TABLE ON THE ENVIRONMENT AND THE ECONOMY: ABOUT US

Emerging from the famous Brundtland Report, *Our Common Future*, the National Round Table on the Environment and the Economy (NRTEE) has become a model for convening diverse and competing interests around one table to create consensus ideas and viable suggestions for sustainable development.

The NRTEE focuses on sustaining Canada's prosperity without borrowing resources from future generations or compromising their ability to live securely.

The NRTEE is in the unique position of being an independent policy advisory agency that advises the federal government on sustainable development solutions. We raise awareness among Canadians and their governments about the challenges of sustainable development. We advocate for positive change. We strive to promote credible and impartial policy solutions that are in the best interest of all Canadians based on research, stakeholder engagement, and consideration by Round Table members.

We accomplish that mission by fostering sound, well-researched reports on priority issues and by offering advice to governments on how best to reconcile and integrate the often divergent challenges of economic prosperity and environmental conservation.

The NRTEE brings together a group of distinguished sustainability leaders active in businesses, universities, environmentalism, labour, public policy, and community life from across Canada. Our members are appointed by the federal government for a mandate of up to three years. They meet in a round table format that offers a safe haven for discussion and encourages the unfettered exchange of ideas leading to consensus. This is how we reconcile positions that have traditionally been at odds.

We also reach out to expert organizations, industries, and individuals to assist us in conducting our work on behalf of Canadians. These partners help spark our creativity, challenge our thinking, and generate the momentum needed for success.

The *National Round Table on the Environment and the Economy Act* underlines the independent nature of the Round Table and its work. The NRTEE reports, at this time, to the Government of Canada and Parliament through the Minister of the Environment.

The NRTEE maintains a secretariat, which commissions and analyzes the research required by its members in their work. The secretariat furnishes research, administrative, promotional, and communications support for NRTEE activities and operations.

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NRTEE RESPONSE TO ITS OBLIGATIONS UNDER THE *KYOTO PROTOCOL IMPLEMENTATION ACT*

1.0 INTRODUCTION

On June 22, 2007, the *Kyoto Protocol Implementation Act* (henceforth KPIA or C-288), received Royal Assent.

The KPIA stipulates that the Government of Canada is obliged to prepare — on an annual basis — a Climate Change Plan describing measures and policies enacted by the government to "ensure that Canada meets its obligations under Article 3, paragraph 1, of the Kyoto Protocol" [Subsection 5(1)]. The government's third Climate Change Plan was released on June 2, 2009.

Subsection 10(1) of the *Act* requires the National Round Table on the Environment and the Economy (NRTEE or Round Table) to, within 60 days of the publication of the Climate Change Plan stipulated in Subsection 5(1), perform the following with respect to the Plan:

a) undertake research and gather information and analyses on the Plan or statement in the context of sustainable development; and

b) advise the Minister on issues that are within its purpose, as set out in section 4 of the *National Round Table on the Environment and the Economy Act*, including the following, to the extent that they are within that purpose:

   i) the likelihood that each of the proposed measures or regulations will achieve the emission reductions projected in the Plan or statement;

   ii) the likelihood that the proposed measures or regulations will enable Canada to meet its obligations under Article 3, paragraph 1, of the Kyoto Protocol, and

   iii) any other matters that the Round Table considers relevant.

This report represents the third response of the National Round Table on the Environment and the Economy to the requirements created by the *Kyoto Protocol Implementation Act* with respect to the government's third Climate Change Plan. In carrying out its statutory obligations, the NRTEE has undertaken and gathered information. This activity has focused on addressing Subsections 10(1)(b)(i) and 10(1)(b)(ii). As allowed for under Subsection 10(1)(b)(iii), the NRTEE has also reviewed and commented upon broader aspects of the KPIA as it relates to the government's Plan.

In accordance with the stipulations of the *Act*, the report has been provided to the Minister of the Environment. This fulfills the NRTEE's current obligations under the KPIA.

The government's 2009 KPIA Plan, *A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act – May 2009* (henceforth referred to as the 2009 Plan),[1] details expected emissions reductions resulting from specific measures to address climate change, as well as an integrated modelling analysis[2] that presents the reductions expected to accrue from the full suite of policies[3] relative to a business as usual emissions pathway.[4] The stated emissions reductions for individual policies outlined in the 2009 Plan are derived from initiative-level evaluations performed by Environment Canada, Natural Resources Canada (NRCan), and Transport Canada, while the aggregate figures are compiled by Environment Canada.

The analysis in this Response examines whether the stated emissions reductions attributed to the suite of policies as a whole and to individual policies accurately reflect the incremental emissions reductions we should expect to see as a result of their implementation.[5] By

1 Canada, 2009a. See http://www.ec.gc.ca/cc/E653A4ED-120F-4185-9494-9B2946CC73F3/KPIA_2009.pdf

2 In the 2008 Plan, the government introduced its integrated modelling framework for the purposes of the KPIA. The modelling is undertaken using Environment Canada's Energy-Economy-Environment Model for Canada, or E3MC, and models the impacts of all of the policies together.

3 Denoted in the Plan as "projected emissions including government measures."

4 Denoted in the Plan as "projected emissions excluding government measures."

5 Incremental emissions reductions are those which occur over and above what could reasonably have been expected to occur absent the policies or actions.

extension, it also assesses the degree to which the emissions projections reflect the best expectations of what will be seen in GHG emissions inventories for the years 2008–2012.

The 2009 Plan notes the NRTEE's contribution from previous Responses toward a "continuous cycle of improvement"[6] and the government's commitment to this cycle. The NRTEE wishes to acknowledge at the outset that the government continues to make improvements to its forecasting, particularly in providing additional information and context, rendering it more transparent and accountable. These improvements include providing an estimate range — "high" and "low" — for some measures that can offer a more realistic possibility of outcomes, and an alternative scenario involving different macroeconomic assumptions and considerations. These are positive, useful additions we support. We hope that the 2009 Response by the NRTEE can further assist the government in its ongoing efforts to improve GHG forecasting and policy evaluation.

This Response is organized as follows: Section 2 lays out three key considerations that inform and provide important context for the 2009 KPIA Response. Section 3 describes the methodological approach taken by the NRTEE. Section 4 provides an overview of the 2009 Plan itself. Section 5 highlights the key issues that emerged from our analysis and assessment. Section 6 evaluates the Plan in the context of Canada's Kyoto Protocol obligations. Finally, Section 7 draws conclusions and provides recommendations. Detailed analysis of individual policies and programs is provided in Appendix A.

6 2009 Plan, p. vi.

2.0 MAIN CONSIDERATIONS FOR THE 2009 RESPONSE

In approaching this year's KPIA Response, the NRTEE has identified three main considerations informing our analysis and assessment: (1) issues related to the implementation of the Regulatory Framework, (2) the soon-to-be released GHG inventory from Environment Canada, and (3) continued concerns of the NRTEE in evaluating the government's progress in reducing emissions within a short time period given the long-term nature of the challenge in reducing GHG emissions. Each of these suggests caution in any final determination of actual emission reductions versus forecast emission reductions, and should be the context in evaluating annual forecasts such as these and in drawing any absolute conclusions.

1. The Regulatory Framework

The government stated in the 2009 Plan its intention to revise the Regulatory Framework, which is the single-largest contributor to emission reductions in the Plan. It said: "Earlier this year the Government indicated that it was refining this approach to reflect the new realities of the global economic downturn and the opportunities represented by a new Administration in the United States. The Government has committed to releasing detailed plans by year's end.... Given the KPIA deadlines for reporting, the 2009 Plan cannot reflect the new regulatory approach. Therefore, to comply with the *Act*, this Plan includes the expected emissions reductions for the industrial regulations as described in *Turning the Corner*, though the final regulatory regime will differ from *Turning the Corner*."[7] This statement suggests 2009 is a transition year for federal climate policy and that the emission profile for Canada may be different going forward.

2. The GHG Inventory

Later this year, Canadians will see the actual emissions inventory for greenhouse gases for Canada including 2008. This will be the first inventory released during the KPIA period — the period during which the government has forecasted emissions reductions from the measures and policies in the 2007 to 2009 Plans. *Canada's GHG Inventory* numbers for 2008 by Environment Canada will provide a retrospective measurement of the actual emissions produced by Canada. Only then can KPIA forecasts be compared to actual physical emissions and a more accurate assessment of the government's programs and measures in reducing emissions be determined beyond this particular Response.

3. Continued Concern with the Narrow Time frames of the KPIA Period

In its 2007, 2008, and current Response, the NRTEE reiterates its concern with the short time frames of the KPIA period as a useful tool for judging progress and evaluating effectiveness. This limits the ability of the NRTEE to draw absolute conclusions about emission reductions associated with government policies and measures. While annual assessments can tell us something about emission reduction pathways, the focus should be on creating a comprehensive policy approach and establishing a corresponding evaluation and assessment framework for measuring progress and making the necessary adjustments toward longer-term emission reduction objectives. The 2009 Plan acknowledges this point, suggesting, "The Government of Canada strongly agrees with the NRTEE's assessment.... That is why Canadian action on climate change is focused on the future; on meeting the goal of a 20% reduction in greenhouse gas emissions from the 2006 level by 2020, and a 60% to 70% reduction from the 2006 level by 2050."[8]

7 2009 Plan, p. 8.

8 2009 Plan, p. 3.

3.0 METHODOLOGY

In its 2007 Response to its obligations under the KPIA, the NRTEE developed an analytical framework by which to evaluate the likelihood that the proposed measures or regulations would achieve the projected emission reductions in the Plan, and the likelihood that the proposed measures would allow Canada to meet its requirements under the Kyoto Protocol. The NRTEE used the same methodological approach in its 2008 Response, and continues to use the methodology for the 2009 Response.

The NRTEE's analysis is a qualitative one, not a quantitative one. We do not produce an alternative set of numbers for comparison given the limited time and resources available within the confines of the *Act*. Where we conclude that stated emission reductions are likely not to be achieved, we cannot say definitively by how much or what the exact number might be. Instead, we looked at the assumptions and methodology for each measure. It is important to recognize that emission forecasting is not an exact science. Its utility lies particularly in the directions it conveys and policy choices it helps illuminate for decision makers.

An initial assessment of the necessary (and available) analytical tools and methodologies led the NRTEE to conclude that the best approach to assessing ***likelihood*** was to determine whether the estimates themselves were accurate descriptions of the outcomes that could reasonably be expected from the policies and program initiatives described in the government's Plan. Given the nature of the mandate and the timelines involved, the presentation of a qualitative sense of predictive accuracy as opposed to a complete modelling of policy outcomes was chosen as most appropriate. As a result, the NRTEE has derived, where possible, a qualitative conclusion for each policy or measure. The statistical evidence and underlying assumptions suggest one of the following:

- An overestimate of eventual emissions reductions
- A reliable estimate of eventual emissions reductions
- An underestimate of eventual emissions reductions.

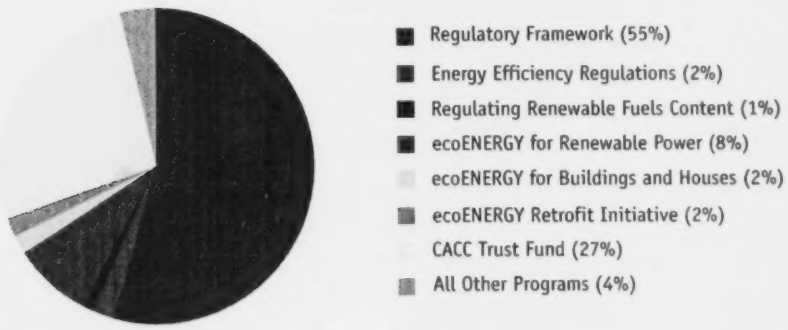
To be clear, the NRTEE is not in a position to provide a definitive statement on the actual emissions reduction level attributable to each policy and measure individually, or in total. Rather, it is providing an assessment — on the basis of what it knows about the underlying assumptions — of whether the measures and policies described in the Plan are likely to result in the suggested emissions reduction levels. All forecasting is uncertain and cannot be expected to be 100 per cent accurate. Defining the likelihood of achieving a stated emission reduction must in turn be qualified by this assumption. A qualitative assessment for each program or policy using this framework is provided in Appendix A.

4.0 THE 2009 PLAN

The 2009 KPIA Plan is similar in many ways to the 2008 Plan. It presents projected emission reductions from individual policies or programs, as developed by the department responsible for the measure. It also presents an overall projection from the full suite of measures; this projection is developed by Environment Canada using an integrated modelling framework.[9]

Figure 1 shows the percentage of emissions reductions attributed to individual measures over the Kyoto time frame from the 2009 Plan. The majority of the program-level emissions reductions are attributed to the Regulatory Framework for Industrial GHG Emissions, the Clean Air and Climate Change Trust Fund, the new Energy Efficiency Regulations, Renewable Fuel Content

Figure 1: Contributions of Programs and Policies to Cumulative Projected Canadian GHG Emissions Reductions, 2008-2012


Regulatory Framework (55%)
Energy Efficiency Regulations (2%)
Regulating Renewable Fuels Content (1%)
ecoENERGY for Renewable Power (8%)
ecoENERGY for Buildings and Houses (2%)
ecoENERGY Retrofit Initiative (2%)
CACC Trust Fund (27%)
All Other Programs (4%)

	Emissions Reductions (Mt CO_2e)						
	2008	2009	2010	2011	2012	Total	Annual Average
Regulatory Framework	0.0	0.9	46.6	55.3	61.6	164.4	32.9
Energy Efficiency Regulations	0.1	0.3	0.8	1.4	3.6	6.1	1.2
Regulating Renewable Fuels Content	0.0	0.0	0.3	1.0	2.1	3.4	0.7
ecoENERGY for Renewable Power	2.2	3.7	5.5	6.7	6.7	24.7	4.9
ecoENERGY for Buildings and Houses	0.3	0.6	1.1	1.6	2.0	5.6	1.1
ecoENERGY Retrofit Initiative	0.5	0.7	1.2	1.7	1.7	5.7	1.1
CACC Trust Fund	16.0	16.0	16.0	16.0	16.0	80.0	16.0
All Other Programs	0.6	1.9	2.5	2.8	3.0	10.8	2.2
TOTAL	**19.6**	**24.1**	**73.9**	**86.4**	**96.6**	**300.6**	**60.1**

9 In the 2008 Plan, the Government introduced its integrated modelling framework for the purposes of the KPIA. The modelling is undertaken using Environment Canada's Energy-Economy-Environment Model for Canada, or E3MC. Under this approach, all policies are modelled together in the E3MC model, which simulates the supply, price, and demand for all fuels and also includes macroeconomic effects. Free-ridership, additionality, and interaction effects are addressed through integrated modelling.

Standards, and the ecoENERGY for Renewable Power program. This figure clearly illustrates the importance of the Regulatory Framework in contributing to emission reductions as laid out in the Plan, representing 55% of all forecast reductions. While the remaining programs provide a relatively smaller share of total reductions, the KPIA obligates government to set them out individually and provide an estimated emission reduction for each one. Accounting for emissions reductions may vary across programs, but the overall impact of these programs on the total set of emission reductions is modest. This measure-by-measure breakdown in the 2009 Plan has changed little from the 2008 Plan in terms of numbers, assumptions, and methodologies.

However, there are some differences in the 2009 Plan, in the details of the Plan, and the context in which the Plan has been developed. Some of these changes are in response to suggestions from the NRTEE in previous KPIA Responses but also come from the Spring 2009 Audit of the 2007 and 2008 KPIA Plans by the Commissioner of the Environment and Sustainable Development (CESD).

For each measure-level forecast, the Plan now includes a range of emission reductions that could result from the measure. This uncertainty analysis is a response to a recommendation from the CESD. The Spring 2009 CESD report suggested the government should "describe the quantitative or qualitative uncertainties related to the expected GHG reductions of each measures. A range of potential emission reduction levels should be presented for the annual plans as a whole and for the individual measures where possible."[10]

Similarly, uncertainty analysis was developed for the integrated modelling. Two distinct scenarios using the integrated modelling framework are presented to illustrate how different assumptions about economic growth and the price of oil can affect growth of emissions. In principle, analysis of the uncertainty that underlies the estimates provided for individual programs clearly improves the overall forecasting practice. Providing alternate scenarios based on different assumptions reinforces the fact that actual emission reductions are subject to factors beyond government control, such as the state of the global economy. The NRTEE considers both of these as useful additions to the KPIA Plan and offers recommendations on how to further improve the uncertainty analysis later in this document.

10 Canada, 2009d, p. 80.

5.0 ANALYSIS AND ASSESSMENT

The NRTEE's 2009 analysis and assessment focuses on two methodological issues and differences in what is presented in the Plan and our preferred approach to calculating emission reductions. The first relates to the Regulatory Framework, including how emissions and emissions reductions are defined in the Plan. In this instance, the Plan accounts for compliance with the Regulatory Framework as emissions reductions even if compliance mechanisms such as contributions to the Technology Fund or credit for early action will not result in emissions reductions within the Kyoto period. The second issue relates to the relationship between the program-by-program analysis and the integrated analysis of all the measures together. Here, issues of additionality and free-ridership result in larger projected emissions reductions in the forecasts for some individual policies and programs, than in the integrated modelling forecast. Both of these issues were identified previously by the NRTEE in its 2008 Response. A detailed analysis of each program and policy is provided in Appendix A.

Definitions of Projected Emissions under the Regulatory Framework

As in previous Responses, the NRTEE notes a persistent concern in defining emissions under the Regulatory Framework, particularly with the Technology Fund. Previously, the Round Table had indicated that emission reductions attributed to the Technology Fund should be counted only when the reductions actually occur, not when compliance fees are paid into the Fund by covered entities. Virtually all of the reductions derived from technologies funded by the Fund will only occur outside the KPIA period as the technologies have not yet been financed from the Fund, since it is not yet operational. The spring 2009 CESD Report highlighted similar concerns. The CESD suggests compliance contributions by firms into the Technology Fund should only be counted once reductions occur. From the perspective of the Round Table, this should not be considered as a comment on the efficacy of the Technology Fund as an instrument to reduce emissions; rather, only on the accounting of actual versus forecast emission reductions flowing from it. The government is aware of this difference in approach, formally disagreeing with it in its response to the CESD's report. For purposes of clarity, that response is quoted below:

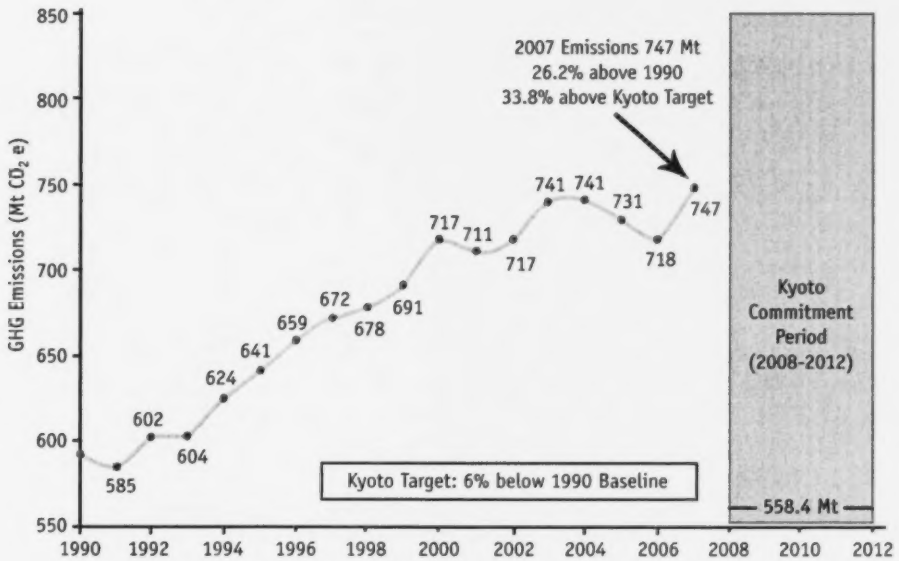
"The Regulatory Framework provides a number of options to industry for meeting these obligations. Environment Canada's modelling indicates that the choice of compliance option is influenced by differences in marginal costs that they present to regulated industries and therefore, actual in-year reductions may vary from the plan's estimates, depending on the specific compliance options chosen by individual firms. Because the Framework is market-based, it is not possible to establish with certainty which options will be most used by industry, and any such estimate would be so heavily dependent on a variety of technical assumptions that it would be inappropriate for use for the purpose of compliance with the *Kyoto Protocol Implementation Act*."[11]

While the government's view is that as contributions made now to the Technology Fund under the Regulatory Framework will in fact lead to emission reductions in the future — so they should be accounted for in the present — a conclusion from the NRTEE's evaluation is that accounting for potential future emissions reductions as actual realized reductions will result in a likely overestimate of emissions reductions within the KPIA period, which is the focus of the *Act* and the object of the analysis conducted. The NRTEE believes the Regulatory Framework will result in emission reductions. Our issue is the time frame in which these should properly be accounted.

11 Canada, 2009d, p.79.

Building on the issues raised in its analysis of the Regulatory Framework in its 2008 Response, the NRTEE also sees a continuing underlying issue with the Framework: the definition of emissions and emission reductions. As part of its responsibility for GHG emissions monitoring, accounting, and reporting, Environment Canada maintains *Canada's GHG Inventory* "which contains GHG emissions data at the national, provincial and sectoral levels and is submitted to the United Nations Framework Convention on Climate Change (UNFCCC) annually. This is the source to be used for all-inclusive national and provincial totals."[12] The inventory tracks the GHG emissions that were produced in Canada in a given year. Figure 2 shows Canada's official emissions inventory.

Figure 2: Canada's GHG Emissions Inventory, 1990-2007 (Source: Environment Canada)[13]



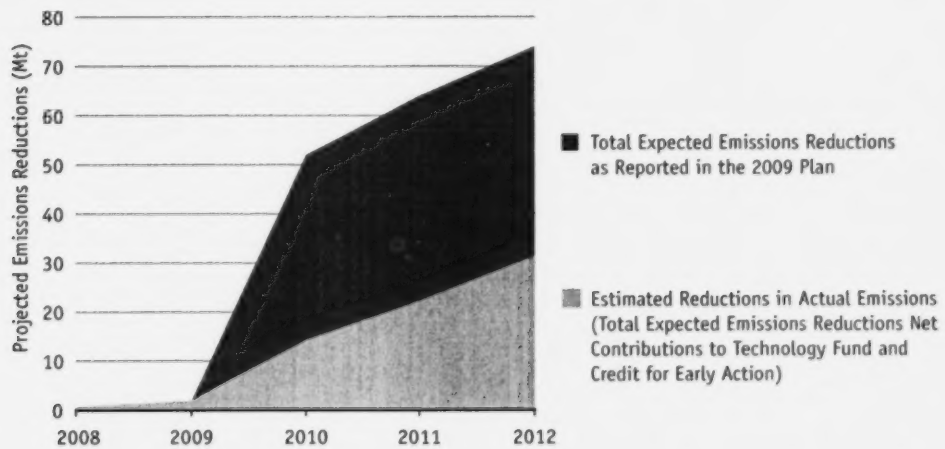
12 http://www.ec.gc.ca/pdb/ghg/ghg_home_e.cfm, accessed July 8, 2009.

13 Canada, 2008f. http://www.ec.gc.ca/pdb/ghg/inventory_report/2007/som-sum_eng.cfm

However, the definition of *emissions* used in the forecasts provided in the Plan is not the same as the definition of emissions used by Environment Canada for emissions inventories for purposes of the UNFCC. The Plan presents forecasts of what the government has previously defined as *Regulatory Emissions*.[14] These KPIA regulatory emissions are emissions net of compliance activities that firms undertake in response to the policies and programs under the Regulatory Framework policy. However, as noted above, compliance activities include actions that do not reduce actual emissions in the KPIA time period — specifically contributions to a Technology Fund and credits for previous emissions-reducing actions (*early action*). While these compliance activities will satisfy the regulation, they will not necessarily result in decreased emissions in the time frame that would ultimately be recognized in the inventory.[15] Similarly, the Plan includes in its definition of *emissions reductions* any compliance activity under the Regulatory Framework.[16] Regardless of whether these reductions are defined relative to 1990, relative to 2006, or relative to business as usual, this methodological approach will result in a likely overestimate of the actual reduction in inventoried GHG emissions that will occur as a result of the policies. The KPIA forecast in the Plan entitled *Expected Emissions Including Government Measures* does not therefore reflect a best estimate of what future emissions *inventories* will show with the policies in place because of this difference in definition and methodology. In this case, a different metric is being forecast than what is being measured.

Figure 3, below, illustrates the above point. It compares regulatory compliance through payments under the Technology Fund and other measures to actual physical emissions reductions. If regulatory compliance is used as a definition for projections of future emissions, then projected emission reductions would be larger and forecasts would be overestimated.

Figure 3: Total Expected Emissions Reductions and Estimated Actual Reductions[17]



14 In the 2008 Plan these projections were called Regulatory Emissions. In the 2009 Plan, they are called *Expected Emissions Including Government Measures*.

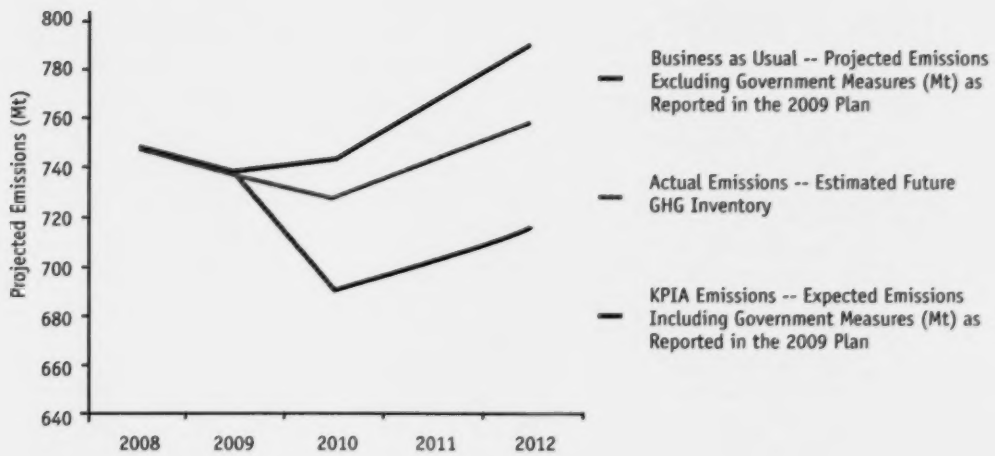
15 See Appendix A for detailed evaluation of the projected emissions for the Regulatory Framework.

16 The Plan estimates *Expected Emissions Reductions* as the difference between the KPIA regulatory emissions and the business as usual emissions. Since the KPIA regulatory emissions include all compliance activities, the *Expected Emissions Reductions* include Technology Fund compliance and credits for previous reductions.

17 Estimates in this figure are based on analysis provided by Environment Canada.

This definitional issue has an effect on the overall Kyoto Protocol targets. The Plan states: "Given the reductions anticipated from the measures in this Plan, Canada expects to be 802 Mt above its Kyoto Protocol target of 2,792 Mt during the 2008 to 2012 period."[18] A reader would interpret this to mean that Canada's emissions inventory will average 718.8 Mt/year (2792 Mt target + 802 over the target =3594 Mt over 5 years). Analysis provided below, using the government's assumptions suggests Canada's emissions inventories will likely be closer to 743 Mt per year as shown in Figure 4, and the Kyoto gap would therefore be 926 Mt.[19] As emissions inventories — the actual emissions — are compiled and released each year, it will facilitate comparisons between forecasts as set out in the KPIA and results as set out in previous year inventories. This comparison will in turn facilitate discussion on the effectiveness of policies and consideration of more or different approaches, something beyond the scope of the KPIA and the NRTEE's role under it. Importantly, no final conclusion on to what extent Canada will exceed its Kyoto obligations can be determined until after 2012 when a formal accounting is done as set out within the Protocol itself.

Figure 4: Estimated Future Emissions Inventories and Trajectories Based on the 2009 Plan



18 Canada, 2009a, p.30.

19 This calculation assumes that 32.6, 36.6, and 37.7 Mt of *actual emissions* will be offset in regulatory terms by contributions to the Technology Fund in 2010, 2011, and 2012 respectively and that 15 Mt of credits for early action will be allocated and used to offset 15 Mt of actual emissions during the same period. The Actual Emissions trend in Figure 4 is therefore calculated as the *KPIA emissions* trend less the estimated regulatory compliance through Technology Fund contributions and credits for early action. This assessment is based on the Environment Canada assumption — as described in the *Detailed Emissions and Economic Modelling Report* (2008b) — that the Technology Fund will represent the cheapest option for firms to comply with the requirements of the Regulatory Framework for Air Emissions. While uncertainty does exist as to the actual compliance choice chosen by emitters, these numbers are consistent with analysis provided in meetings with Environment Canada.

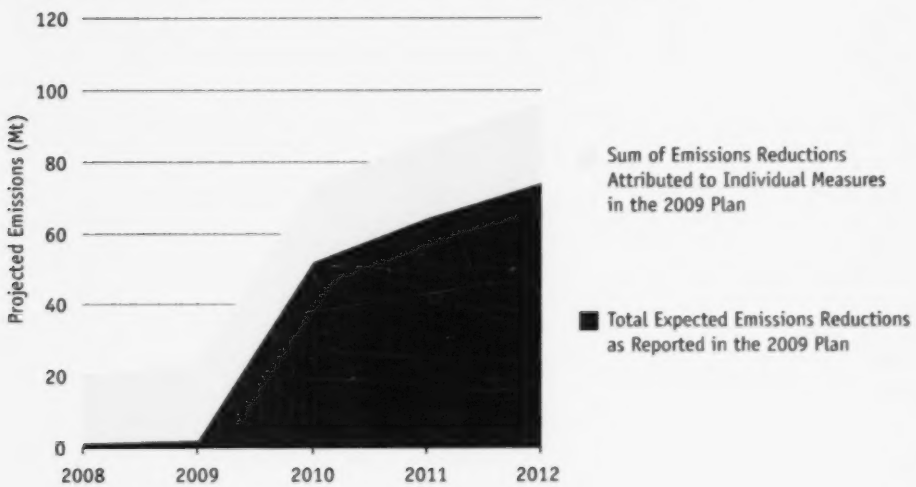
Relationship between the integrated and program-by-program analyses

The second methodological issue deals with consistency between the projections of emission reductions from individual policies and programs and the integrated modelling of the full suite of programs. Following a previous NRTEE recommendation in 2007, subsequent plans have incorporated integrated modelling to account for the policy interaction effects among measures without which there would be some double-counting of emission reductions, or additionality. The Plan does, therefore, provide a realistic estimation of emission reductions under the integrated modelling. It also sets out an aggregate number that is the sum of the emission reductions attributed to each of the individual policies and programs. This would appear to lead to more total reductions than the bottom-line number reported using an integrated modelling approach.

Figure 5 illustrates the difference between the two sets of emissions reduction projections based on a comparison of the two approaches. For example, the government projects, through integrated modelling, that all 19 of the programs and policies in the Plan combined will result in about 1 Mt of emissions reductions in 2009. However, adding up the reductions attributed to each individual program and the CACC Trust suggests approximately 24 Mt of emissions reductions for 2009 are attributed to the same set of measures (as illustrated in Table 3 in Appendix A).

Similar to its 2007 and 2008 Responses, NRTEE analysis suggests that some of this discrepancy between the integrated modelling and the program-by-program analysis is unavoidable due to *policy interaction effects*. As noted by the NRTEE in previous Responses, a methodological approach that addresses this discrepancy, as well as previously identified concerns by the NRTEE over free-ridership, other additionality issues and rebound effects within each of the individual measures, should be utilized.

Figure 5: Total Emissions Reductions Attributed to Measures in the Plan, and the Emissions Reductions of the Measures Projected Using Integrated Modelling[20]



20 Estimates in this figure are based on analysis provided by Environment Canada.

Examples of Additionality

Concerns about additionality arise where policy-level evaluations account for more than the incremental emissions reductions they generate. In the 2009 Plan, additionality concerns arise in two principal forms. First, incentive programs such as the ecoENERGY for Renewable Power and the ecoENERGY Retrofit initiative include all emissions reductions associated with financed projects rather than just those emissions reductions actually induced by the incentives. This issue is known as the free-rider effect, where program effects may be overestimated if at least some portion of the projects financed under any incentive program likely would have occurred absent the incentive. The second source of additionality concerns is found in the evaluation of information and voluntary programs. For example, under the ecoFREIGHT program, Canadian transporters have signed a *Memorandum of Understanding* in which they agree to undertake measures necessary to meet US legislation. Some of these reductions would likely have happened absent any action on behalf of the Canadian government; for example, freight transporters who operate in the US would likely decide to meet US legislation regardless of Canadian government actions. Additionality results from an assumption that none of the actions that result in consumers buying energy efficient products, renovating their houses, or which result in firms changing their business practices would have occurred without the contribution of the federal government's climate policies. These assumptions lead to a likely overestimate of the impact of these policies.

When policies are tested in Environment Canada's E3MC model, reductions are derived through forecasts of the economy with *and* without the policies in place. As such, the baseline is very clear, and only incremental reductions due to the policies will be counted.[21] The issue thus exists in the individual program-by-program projections prior to being run through the integrated modelling. The greater the additionality concerns at the individual measure level, the greater the gap will be between the integrated estimates provided on page 30 of the Plan and the sum of the individual actions found throughout the Plan.

Examples of Rebound

As in previous year's Plans, reductions attributed to regulatory changes do not fully account for induced increases in usage intensity (the rebound effect) as suggested in the NRTEE 2007 and 2008 Responses. As new technology becomes cheaper to use with increases in efficiency, empirical evidence consistently confirms that increases in use erode some of the reductions in emissions. While the rebound effect is properly accounted for both in the integrated modelling and in policy-level analysis of certain programs (the ecoENERGY for Vehicles Program), it is not accounted for in others, which leads to a likely overestimation of induced emissions reductions. Since program-level estimates for the ecoENERGY Retrofit Initiative and Energy Efficiency Regulations do not account for rebound effects, but these are accounted for in the integrated modelling, the gap between the integrated estimates provided on page 30 of the Plan and the sum of the individual actions found throughout the Plan is larger than it should be.

Only an integrated forecast that imposes all of the policies simultaneously can account for policy interaction effects, which is why such an approach was recommended by the NRTEE in its 2007 Response and adopted by the government in their 2008 and 2009 Plans. Note, however, that even if the issues of additionality and rebound effects were fully corrected, and the assumptions with respect to impacts were the same in the program-level and integrated modelling, the individual estimates should not be expected to sum up to the total reductions, as policy interaction effects would also result in differences between the forecasts.

21 As indicated in the NRTEE's 2008 response, the use of integrated modelling is an important improvement from the first KPIA Plan in 2007.

There are two practical ways to assess the contribution of an individual program — either determine how much the program would (on its own) reduce emissions from the business as usual emission pathway ignoring all other programs; *or* consider how much actual emissions would increase if only that program was removed, leaving all other programs in place. Either of these measures captures a type of *marginal* or *incremental* contribution of the program.[22] In the 2008 NRTEE Response, the second method of calculating impacts was advanced. The NRTEE recommended that Environment Canada report incremental contributions of each individual policy by successively removing each policy leaving all others in place in the model, and comparing the resulting emissions to the business as usual forecast. This would lead to more accurate forecasting in terms of attributing specific emission reductions to specific measures and avoid confusion.

22 Consider the following example. If there are two programs in place, we can either evaluate the first assuming that the second is also in place or not. Equivalently, we could evaluate the changes in emissions of removing the second program, assuming that the first remained in place, or assuming that it had already been removed.

6.0 KYOTO OBLIGATIONS

The emissions reductions reported in the Plan will result in Canada not meeting its Kyoto Protocol target of 6% below its 1990 emissions levels, as stated by the government. To achieve this target, Canada's emissions must average 558 Mt per year over the 2008–2012 compliance period.[23] As discussed above, Canada's compliance with the Kyoto Protocol will be based on actual emissions and not the regulatory emissions provided in the Plan. The KPIA requires the NRTEE to assess the likelihood that the proposed measures will enable Canada to meet its Kyoto obligations. According to the Plan, "Canada expects to be 802 Mt above its Kyoto Protocol target of 2792 Mt during the 2008 – 2012 period." There is a likelihood that this gap could be greater. As set out in Table 1, below, and based on the analysis above and in Appendix A, the gap between Canada's emissions and its Kyoto target could be 926 Mt over the Kyoto Period, or 185 Mt/year on average[24] due to the distinction between *actual* and *regulatory* emissions, as discussed above.

In order to be considered in compliance with the Kyoto Protocol in terms of total emissions, Canada's emissions must not exceed its total assigned commitment, except where this is offset through the use of approved flexibility mechanisms. It cannot be concluded with absolute certainty that Canada will not be in compliance until after 2012 when final, actual emissions are determined and any use of international flexibility mechanisms is reconciled.

Table 1: Annual Allowable Units, Projected Emissions, and Implied Excess Emissions over the First Commitment Period (2008-2012) Under the Kyoto Protocol Based on NRTEE Analysis[25]

Year	2008	2009	2010	2011	2012
Kyoto Target (2008-2012 average) (Mt)	558				
Actual Emissions Projections (Mt)	748	737	729	744	759
Average Kyoto Gap (Mt/yr)	185				
Commitment Period Projected Excess Emissions (Mt)	926				

23 This target could also be expressed as a 160 Mt reduction relative to 2006 levels or, based on Environment Canada's business as usual forecast from the Plan, as a reduction of 199 Mt relative to business as usual.

24 This calculation assumes that 32.6, 36.6, and 37.7 Mt of actual emissions will be offset in regulatory terms by contributions to the Technology Fund in 2010, 2011, and 2012 respectively and that 15Mt of credits for early action will be allocated and used to offset 15Mt of actual emissions during the same period. This is based on the Environment Canada assumption that the Technology Fund will represent the cheapest option for firms to comply with the requirements of the Regulatory Framework for Air Emissions.

25 The numbers in this Table are from NRTEE estimates of likely actual emissions. As described in Section 5.0, they are calculated from the KPIA integrated modelling forecast less compliance through the Technology Fund and credit for early action, which would not result in actual physical reductions within the short-term Kyoto period.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The NRTEE's analysis and consideration of the 2009 Plan in the context of the KPIA leads it to several conclusions.

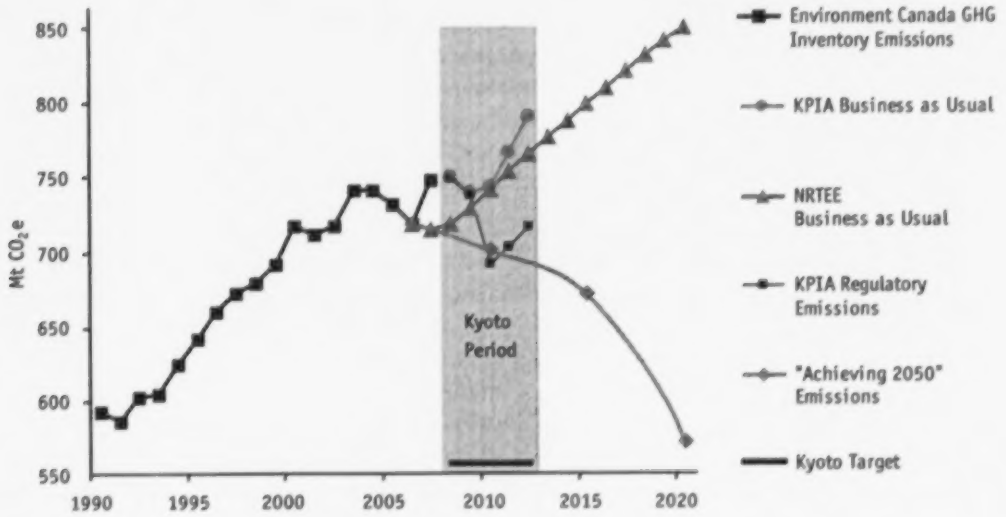
First, it is likely that many of the emission reductions attributed to specific measures and policies are overestimated due to the particular methodological issues and approaches set out above. This is most apparent in the Technology Fund as it is a key component of the proposed Regulatory Framework, the accounting of the Climate Change Trust Fund, and the persistence of free-ridership, rebound, and additionality issues in some of the individual measures. As the NRTEE was not in a position to conduct alternative economic modelling, we cannot be definitive in determining by how much emission reductions are overestimated. The publication of emission inventories for 2008 this year, for 2009 next year, and so forth, will bring additional clarity as to which measures are or are not achieving their stated emission reductions and assist in future forecasting under KPIA plans and other government initiatives.

Second, there are deficiencies in relying exclusively on the KPIA annual assessment approach — with its short-term focus and unclear definition of emissions — as the formal accountability mechanism and process for forecasting and tracking emission reductions in Canada. Climate change is a long-term problem requiring long-term solutions, a point made by the NRTEE in its two previous responses. Transparent forecasting and evaluation processes are important for ensuring Canada is on a path to achieving its long-term reductions. Comparing forecasts of the impacts of the policies to the emissions reductions that eventually result from these policies can allow for improvement of both forecasting methods and of policy over time. Figure 6, developed by the NRTEE, illustrates below how we can incorporate analysis from the 2008–2012 Kyoto period into an appreciation of longer-term trends in meeting stated 2020, and later 2050, targets and follows upon a recommendation we made last year.

Third, a longer-term (post-2012) and transparent process of forecasting and accounting for GHG emission reductions could address not only these last two issues but other areas of question with the Plan. Projections of future emissions reductions attributed to policies estimate the effectiveness of different policy options. All forecasts, however, are inherently uncertain. Actual emissions reductions, determined retrospectively, can provide evidence both to the accuracy of forecasts and to the effectiveness of implemented policies. Properly constructed, this process could result in regular guidance to government not only for improving forecasting methodologies, but also for improving policy design and ultimately emission reductions outcomes. Methodologically sound forecasts can assist governments in judging the cost-effectiveness of spending significant public funds on various regulatory or voluntary programs that may deliver only modest emission reductions. In both instances, it can help guide decision makers in considering other choices or reinforcing measures to achieve emission reduction targets we have set for ourselves and help educate in the challenges behind emissions forecasting and constructing alternative scenarios. Environment Canada's 2008 publication *Detailed Emissions and Economic Modelling*[26] is an excellent platform to build upon. Currently, no public process for evaluating forecasts over the long term exists in Canada.

26 Canada, 2008b.

Figure 6: Comparison of GHG Emissions Pathways Under Various Scenarios



Note:

- *Environment Canada GHG Inventory Emissions* is the actual emissions produced in Canada as determined retrospectively.
- *KPIA Business as Usual* emissions is the reference case provided in the 2009 Plan that forecasts emissions in the absence of government policies.
- *NRTEE Business as Usual* emissions is the reference case in the NRTEE *Achieving 2050* report.
- *KPIA Regulatory Emissions* is the integrated modelling forecast provided in the 2009 Plan that projects emissions under the full suite of government policies and programs.
- *"Achieving 2050" Emissions* is the forecast under the economy-wide carbon pricing policy proposed in the NRTEE's *Achieving 2050* Report necessary to achieve the Government's emissions reductions targets for 2020 and 2050.

In this vein, and as part of the NRTEE's broader consideration of the issues contemplated under the KPIA, we offer the recommendations below. These recommendations are guided by the main considerations established in Section 2 and build on the qualitative analysis in this Response. They help address issues associated with the accounting of projected reductions from the Regulatory Framework and propose an approach to ensure consistency with forthcoming GHG emissions inventory data for 2008 that can provide useful evaluation not just within the KPIA period but also over the longer term.

Recommendation 1: To ensure emission reductions can be accurately attributed to specific measures within a defined time period and to facilitate comparison of emission forecasts with actual emissions, the NRTEE recommends that for future KPIA Plans, the government forecasts estimates of future emissions reductions in terms of projected changes in Environment Canada's GHG Emissions Inventory.

Recommendation 2: To continue the process to date of improving emission forecasting methodologies, measuring progress, and conducting effective policy evaluation, the NRTEE recommends that future KPIA Plans reflect both emissions forecasts and actual emissions data documented in the Environment Canada GHG Inventory and, further, that consideration be given to developing and implementing an ongoing public presentation of this information beyond the KPIA period either by government or an independent authority.

Recommendation 3: To ensure consistency in the approach to forecasting, to address issues of free-ridership, rebound, and additionality, and to ensure greater transparency between forecasted emission reductions on an individual measure-by-measure basis and those derived from integrated modelling, the NRTEE recommends that future KPIA Plans apply more consistent methodologies between the two and provide a more detailed and transparent explanation of differences between the integrated modelling forecasts and the program-by-program forecasts.

Recommendation 4: To build on the greater transparency provided in this year's Plan with the alternative scenario and "high" and "low" forecasts for some individual measures, the NRTEE recommends that this presentation be deepened by providing additional information on the assumptions behind the various forecasts so they can be properly evaluated, and that each be more consistently presented in the Plan to facilitate comparison.

APPENDIX A: ANALYSIS AND ASSESSMENT OF INDIVIDUAL MEASURES

THE DERIVATION OF POLICY-BY-POLICY EMISSIONS REDUCTIONS

The Government's 2009 Plan provides a breakdown of the expected emissions reductions associated with each individual measure or program aimed at or expected to have a role in reducing GHG emissions. The NRTEE's mandate includes the examination of these measure-level estimates to identify potential sources of estimation error in order to determine the likelihood of achieving the stated emission reductions. In general, emissions reduction estimates continue to be subject to the same critiques as have been brought forward in previous NRTEE Responses; however, the methodology behind some estimates has improved over time.

Three main factors contribute to the overestimation of emissions reductions for individual policies. First, many of the evaluations are subject to concerns about *additionality* as estimates report more than just the incremental emissions reductions due to the measures. In these cases, actions that would have occurred absent the programs are treated as part of the programs' effects. Second, evaluations of many of the policies do not incorporate empirically established issues that would erode the estimated emissions reductions, in particular the *rebound effect*. Third, the individual programs are evaluated without considering possible interaction effects.

It is important to recognize a distinction between program design and program evaluation. Evaluation is important to assessing the extent to which good policy design minimizes the impacts of these effects and reporting this outcome accurately. The NRTEE's mandate is not to evaluate whether or not programs have been designed effectively. It should be made clear that the evaluations below look only at the estimation of emissions reductions attributable to each program. For example, with respect to the ecoENERGY for Renewable Power program, information obtained from NRCan for the purposes of this evaluation suggests that substantial steps have been taken to minimize *free-ridership*. This is important from a design point of view to maximize the cost-effectiveness of the program. However, in evaluating the renewable power program, some free-ridership likely remains that should still be discounted from the emissions reductions. These issues are also relevant for other programs; several program-level evaluations assume that free-ridership and rebound effects have no impact at all; minimizing impact through design is not the same as assuming that the impacts have been eliminated altogether. As Table 2 shows, the same concerns have been addressed in the two previous NRTEE responses with respect to evaluation rather than design, and in many cases are addressed again here, but also shows where improvements have been made by the government.

Table 2: Comparison of Additionality Concerns and Accounting for Rebound Effects in Program Evaluation

	Additionality identified as an evaluation concern (includes free-ridership)			Rebound Effects identified as an evaluation concern		
	2007	2008	2009	2007	2008	2009
Regulatory Framework	—	—	—	—	—	—
Energy Efficiency Regulations	✓	✓	✓	✓	✓	✓
Regulating Renewable Fuels Content	✓	—	—	—	—	—
ecoENERGY for Renewable Power	✓	✓	✓	—	—	—
ecoENERGY for Buildings and Houses	✓	✓	✓	✓	✓	✓
ecoENERGY Retrofit Initiative	✓	✓	✓	✓	✓	✓
ecoMOBILITY Initiative	N/A	—	—	N/A	—	—
ecoENERGY for Fleets	N/A	—	—	N/A	—	—
ecoFREIGHT Program	✓	✓	✓	—	—	—
Clean Air and Climate Change Trust Fund	✓	✓	✓	—	—	—

Legend:

- ✓ indicates concern exists
- — indicates no concern exists
- N/A indicates not applicable

Table 3 provides a summary of the projected emissions in the 2009 Plan from programs and policies evaluated in this Appendix. It shows the stated emissions reductions associated with specific programs and actions for each year in the Kyoto period, and programs whose emissions reductions are 1 Mt or greater.[27] Each of these measures is assessed individually in the remaining sections of this Appendix.

Table 3: Reported GHG Emissions Reductions by Policy (Mt)

Year	2008	2009	2010	2011	2012
Regulatory Framework	0	0.9	46.6	55.3	61.6
Energy Efficiency Regulations	0.09	0.26	0.75	1.4	3.55
Regulating Renewable Fuels Content	0	0	0.3	1	2.1
ecoENERGY for Renewable Power	2.2	3.74	5.45	6.67	6.67
ecoENERGY for Renewable Heat	0.01	0.01	0.02	0.02	0.02
ecoENERGY for Buildings and Houses	0.32	0.56	1.13	1.57	2.02
ecoENERGY Retrofit Initiative	0.46	0.67	1.2	1.66	1.66
ecoENERGY for Industry	0.17	0.27	0.37	0.4	0.4
ecoAUTO Rebate Program	0.01	0.01	0.01	0.01	0.01
Green Levy	0.1	0.14	0.17	0.2	0.23
ecoENERGY for Personal Vehicles Initiative	0.03	0.05	0.08	0.1	0.1
ecoMOBILITY Initiative	0	0	0.11	0.11	0.11
National Vehicle Scrappage Program	0.01	0.02	0.03	0.02	0
ecoTECHNOLOGY for Vehicles Program	0	0.07	0.1	0.15	0.2
ecoENERGY for Fleets	0.22	0.34	0.47	0.5	0.5
ecoFREIGHT Program	0	0.98	1.12	1.25	1.37
Marine Shore Power Program	0	0.01	0.01	0.01	0.01
Public Transit Tax Credit	0.03	0.03	0.04	0.04	0.04
Clean Air and Climate Change Trust Fund (CACC Trust)	16	16	16	16	16
Total Projected Emissions Reductions (All Programs including CACC Trust)	19.64	24.06	73.94	86.4	96.59

27 As in the 2008 KPIA response, individual program evaluations with estimated reductions less than 1 Mt are not evaluated given that these small estimated reductions are below the level of precision for this evaluation.

1.1 REGULATORY FRAMEWORK FOR INDUSTRIAL GREENHOUSE GAS EMISSIONS

Table 4: Summary of Analysis for Regulatory Framework for Industrial Greenhouse Gas Emissions

Program	Projected Emissions Reductions in Mt					Key Determinants of Results	Predictive Accuracy
	2008	2009	2010	2011	2012		
Regulatory Framework for GHG Emissions	0	0.9	46.6	55.3	61.6	• use of any compliance mechanism treated as emissions reductions	Likely over-estimate of actual reductions

Summary of the Initiative and Emissions Projections

The Regulatory Framework for Air Emissions (Canada, 2007b) imposes emissions reductions on Large Final Emitters (LFE) forcing affected firms to achieve an 18% reduction in GHG intensity from 2006 levels beginning in 2010, with a further 2% improvement required in each year thereafter. Affected firms may comply with the regulations either through internal abatement, through contributions to a climate change Technology Fund (at an initial rate of $15/tonne), by purchasing the right to claim emissions reductions made by other domestic firms through the emissions trading and offset systems, or by purchasing emissions reductions credits through the CDM mechanism defined under Kyoto. Firms may also claim a one-time credit for GHG reductions between 1992 and 2006.[28] Emissions reductions attributed to the Regulatory Framework for Air Emissions total 164.4 Mt over the five-year Kyoto compliance period.

Analysis

Since the NRTEE 2008 Response, and even since the release of the government's 2009 Plan, significant information has been forthcoming on the result of the 2007 Regulatory Framework with respect to its role in Canada's climate policy. Recent speeches and statements from Environment Canada have suggested implementation of the Regulatory Framework will not commence before 2011 and stating that Canada will be aligning its climate policies with those of the U.S. in order to facilitate the implementation of a North American cap-and-trade regime and other policy approaches. The preamble to the 2009 Plan states that, "to comply with the Act, this Plan includes the expected emissions reductions for the industrial regulations as described in *Turning the Corner*, though the final regulatory regime will differ from *Turning the Corner*"[29]. Since this statement implies that these regulations will change, it follows that the emissions reductions attributable to them are likely to change also and will not occur as stated. Whether the new policy will result in fewer or greater emissions than would have been inventoried under the Regulatory Framework cannot be assessed at this time. In order to fulfill the NRTEE's mandate, an assessment of the reported estimates is provided below under the assumption that the policy is implemented as outlined in *Turning the Corner*.

The estimates provided in the Plan are computed using Environment Canada's integrated Energy, Emissions and Economy Model for Canada (E3MC) that tests the policy against a Reference case and thereby generates an

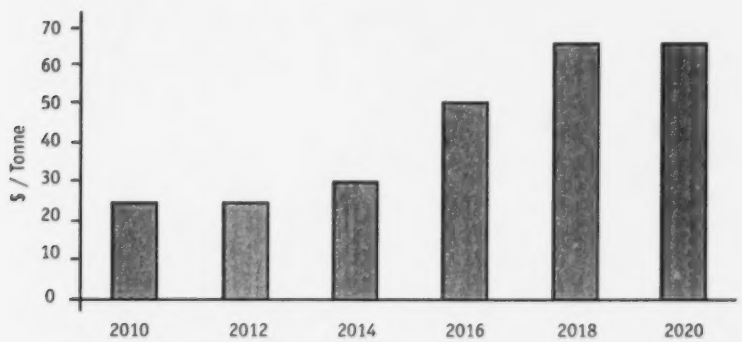
28 With respect to the particular mandate of this study, the provision for early-action means that firms can receive credit for emissions reductions already undertaken prior to 2006. It is important to note here that, while these reductions would be credited under the Regulatory Framework against 2010–2012 emissions, they hold no standing with regard to the Kyoto Protocol.

29 Canada, 2009a, p.8.

estimate of the incremental impact of the regulatory measures. Two key issues led to a conclusion that the emissions reductions attributed to this program are likely overestimates and both are tied to the suite of compliance options available to firms. Both issues are explored in detail below. First, the estimates continue to report reductions in *Regulatory Emissions* rather than reductions in the actual emissions that will be reported in greenhouse gas inventories. Second, in modelling of offsets, the assumptions are such that the cost of offsets is likely overstated, which has ambiguous consequences in terms of emissions reductions during the Kyoto time frame.

In its 2007 and 2008 responses, the NRTEE highlighted a lack of clarity with respect to the treatment of Technology Fund contributions and credits for early action. Technology Fund contributions and credits for early action are likely to account for a large percentage of firms' predicted actions to comply with regulations under the *Framework for Air Emissions*. Given that the Technology Fund compliance fee of $15 per tonne is likely to be among the less expensive compliance options available to firms, it follows that the full 70% of compliance requirements that are allowed to be offset through the Technology Fund will likely be undertaken (70% in 2010, 65% in 2011, 60% in 2012). While it is impossible to say with certainty what option firms will choose, previous Environment Canada modelling has predicted that the Technology Fund will be used to the full extent possible. Figure 7 below shows Environment Canada predictions of the compliance price in each year from 2010 onward, and it is always greater than the $15 rate at which compliance credits may be purchased through contributions to the Technology Fund. If this is the case, unless firms prefer more expensive compliance to the regulations, the Technology Fund contributions can be expected to be maximized.

Figure 7: The Marginal Cost of Compliance for Firms Under the Regulatory Framework (Source: Environment Canada)[30]

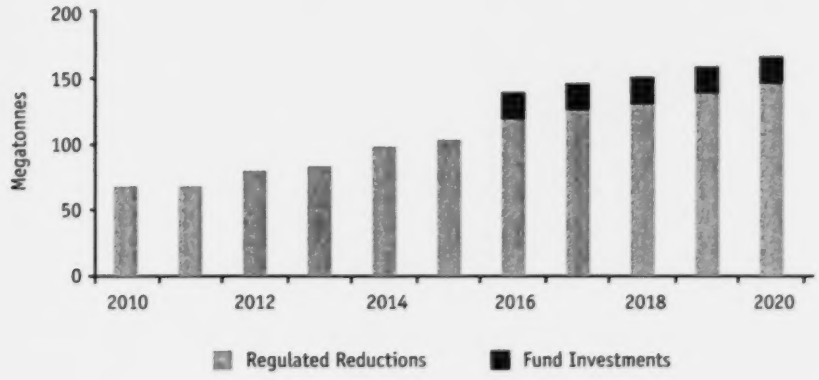


30 Canada, 2008b. http://www.ec.gc.ca/doc/virage-corner/2008-03/571/p2_eng.htm

If firms are principally complying through the use of the Technology Fund, actual emissions will not decrease by as much as predicted in the Plan. By definition, payments into the Technology Fund are made to offset emissions that have occurred, and that would be counted by an emissions inventory. Contributions to the Technology Fund will be used to finance future emissions reductions; however, in this case, there is no guarantee that the quantity of future emissions reductions will be equivalent to the volume of emissions offset by contributions made today, and accounting for them in this way will lead to inaccurate predictions of future actual emissions inventories. In these inventory reports, previous actions or contributions to technology funds will not count against actual emissions. Previous analysis from Environment Canada, as shown in Figure 8, illustrates how regulatory emission reductions from the Techonology Fund are included both in 2008-2012 and as reductions from Fund Investments in 2016-2020.

The regulation also allows credits of up to 15 Mt for early action, defined as activities that reduced emissions between 1990 and 2006. While these activities may have resulted in emissions reductions in the past, they do not represent incremental reductions in emissions during the Kyoto compliance period, and will not be taken account of in the emissions inventory.[31] If any credits for early action are granted the impact of the policy on actual emissions will be less than that reported in the Plan. Approximately 40 Mt of actual emissions per year from 2010-2012 will be offset in regulatory terms through use of the Fund and through credits for early action.[32] This accounts for between 70 and 80% of all compliance activities under the large final emitters program. These emissions will appear in Canada's emissions inventories for the Kyoto period, since this measure tabulates actual emissions and will not take account of regulatory credits or the Technology Fund.

Figure 8: Environment Canada's Estimate of Industrial GHG Reductions under the Regulatory Framework (Source: Environment Canada)[33]



31 There are no credits for early action in the emissions inventory — only a tabulation of actual emissions. Previous actions, as long as they still have an effect on today's emissions will mean that emissions are lower today than they otherwise would have been, but that is irrelevant. If firms are granted credit under the Regulatory Framework for Air Emissions (RFAE) for actions in the past, these will be used to offset emissions that actually occur during the Kyoto period for compliance with RFAE, but these emissions will still appear in Canada's Emissions Inventory.

32 The 2008 Response cited a figure of 20 Mt, which only included contributions to the Technology Fund to offset compliance requirements under the emissions-intensity targets within the RFAE. However, based on new analysis of information acquired from Environment Canada, the 2008 total compliance figures, if emissions intensity compliance and compliance with flaring and HFC guidelines, were both included, 40 Mt of Technology Fund contributions would be made in total. The 2009 figures are consistent with this adjustment.

33 Canada 2008b. http://www.ec.gc.ca/doc/virage-corner/2008-03/571/p2_eng.htm#2_1

Offsets present another source of likely overestimation of reductions. Offsets are essentially the outsourcing of environmental compliance. Rather than reducing emissions in their own facility, a firm may choose to pay another firm to reduce emissions in their operations if the selling firm can do so more cheaply. Since, as far as either climate change or Canada's emissions inventories are concerned, emissions from either source have the same impact, as long as the reduction actually occurs, there is not an issue with offsets.

However, offsets are subject to concerns of additionality. When the government grants an offset credit, it must assess whether emissions reductions are "real, incremental, quantifiable, verifiable and unique reductions of greenhouse gases."[34] The key question is relative to which baseline the offsets are judged to be incremental. In order for offsets to generate emissions reductions, the actions undertaken must be incremental to what would have happened absent the offset program, and this is impossible to know. In practice, the offset rules stipulate that an offset will be granted for activities such as "a reduction in the amount of tillage on farmland…or...generation of electricity from wind energy."[35] As the NRTEE has pointed out with respect to many of the program-level evaluations, it is difficult or impossible to ensure that all offsets are granted for incremental emissions reductions. Attaching an exact number to the *additionality* concerns with offsets is difficult. Authors such as Jaccard and Rivers (2008) have argued that up to 80% of offsets generated under the federal government's guidelines would not represent incremental reductions in emissions.

In modelling the effects of the Regulatory Framework, Environment Canada assumed that only offsets from landfill gas and agricultural methane capture would be available to firms. In reality, the scope for potential offsets goes far beyond these two sectors. The new information released on the offset plan suggests "potential projects that could qualify for offset credits include methane capture and destruction from landfill gas, afforestation and other forestry projects, agricultural soil management and wind energy."[36] If the offset potential in each of these sectors were added to the model, a much larger number of emissions offsets would likely be available at any given price. In other words, at $10/tonne, suppose 1Mt of offsets would be supplied from landfill and agricultural gas capture, Environment Canada modelling treats this as the total supply in the market. However, if other sectors can also participate, the supply would be greater at $10 per tonne. In this case, firms would likely use more offsets and fewer other means of compliance to meet their obligations under the Regulatory Framework than would be predicted by Environment Canada's modelling.

There is a link between the issues of offsets and the Technology Fund. Under the regulatory framework, firms are likely to be deciding at least in part between the use of offsets and the use of the Technology Fund to meet the majority of their compliance requirements. As the Technology Fund contributions will not be reinvested to generate any emissions reductions until after 2012, these payments have no effect on actual emissions during the Kyoto time frame as discussed above.

While it is outside the scope of the KPIA, it is important to note that we do not know how many incremental emissions reductions will eventually be generated for each dollar contributed to the Technology Fund, and so we cannot say whether emissions will be under- or overestimated in the long run given the modelling assumptions on the supply of offsets. What we can say is that it is unlikely that offsets will each represent an incremental emissions reduction in the KPIA period and, due to the limited sectors assumed in the modelling, it is likely that more offset transactions will occur than those currently modelled by Environment Canada.

34 See http://www.ec.gc.ca/default.asp?lang=En&n=714D9AAE-1&news=C890F013-F3EB-4BCA-A5D9-3B6C2427DA55

35 Ibid.

36 Ibid.

Finally, it is important to recognize that the emissions reduction requirements under the Regulatory Framework are not absolute with this policy, but rather the actual reductions will depend on the level of economic activity since the policy requires reductions in emissions per unit of output. The reductions reported in the Plan as a result of the Regulatory Framework are reductions relative to business as usual. If economic growth is faster than expected, business as usual emissions would be higher and the compliance requirements imposed by the emissions intensity standard would be higher also. If, on the contrary, growth is slower, the requirements lead to fewer emissions reductions (but the business as usual emissions are also lower). Evaluating reductions relative to business as usual under an emissions-intensity standard is more difficult than it would be with an absolute requirement since the compliance requirements change with the underlying economic growth trajectory as well as with technological progress.

Conclusions

The above analysis suggests that significant emissions reductions and contributions to future emissions reductions will result from the *Regulatory Framework for Air Emissions*. However, since the estimates provided continue to equate the use of any of the compliance mechanisms with emissions reductions, they are likely an overestimate of actual reductions within the KPIA period. Further, as indicated by the Government, the Regulatory Framework will be modified in its content and timeline, so final determination of accuracy of emissions reductions forecasts must wait.

1.2 ENERGY EFFICIENCY REGULATIONS AND PHASING OUT INEFFICIENT INCANDESCENT LIGHT BULBS

Table 5: Summary of Analysis for Energy Efficiency Regulations and Phasing Out Inefficient Incandescent Light Bulbs

Program	Projected Emissions Reductions in Mt					Key Determinants of Results	Predictive Accuracy
	2008	2009	2010	2011	2012		
Regulating Energy Efficiency	0.09	0.26	0.75	1.4	3.55	• no rebound effect adjustment • many measures included in aggregate baseline	Likely over-estimate

Summary of the Initiative and Emissions Projections

As part of the Regulatory 2009 Plan, the government proposed to update existing standards for 12 product categories, and introduce new energy efficiency standards for 20 more between 2007 and 2010, as well as introduce an effective ban on incandescent light bulbs that would begin in 2012. A proposed regulatory amendment was published in the *Canada Gazette*, Part I, on March 29, 2008, and the Amended Regulations were published in the *Canada Gazette* on December 12, 2008.

Analysis

The analysis framework has not changed appreciably since 2008. According to the methodological document provided by NRCan for the purposes of this evaluation, the emissions reductions provided in the Plan were calculated through analysis of the market share of products currently permissible that would not be in compliance with the new standard. Assuming that the sales of these products would translate to sales of new appliances meeting the standard, the emissions reductions are then calculated. No consideration was explicitly given to the rebound effect, which likely leads to an overestimate on the order of less than 15%.[37] Importantly, the estimates provided by NRCan are decreased by a factor of 15% from the computed values to "accommodate risks to the outcome." This risk factor would likely be sufficient to accommodate error due to the rebound effect if no other delays or changes affect the implementation of the regulation. However, as there are empirical studies of rebound effects for most of the regulated products including residential heating and clothes washers, and these estimates are not consistent across all product groups, it would be desirable for these to be included specifically.

Reducing emissions by improving efficiency standards targets the capital stock of energy-using appliances. As such, estimates of energy savings must take account of three elements. First, the rate at which the new, more-efficient appliances will replace older, less-efficient

37 Empirical evidence cited in the 2007 and 2008 NRTEE responses suggests that the rebound effect is important. A study by Davis (2007) shows that when randomly chosen homeowners are given washers that are on average 48% more efficient in terms of energy use, total resulting energy (and emissions) reduction is just 42.4% rather than 48%. Additional studies by Hausman (1979), Dubin and McFadden (1984), Dubin (1985), Dubin, Miedema, and Chandran (1986) show similar patterns of increased usage intensity after the acquisition of more efficient appliances. As NRCan documentation suggests, program design and messaging can only partially offset these behavioural changes, and so an adjustment factor should be included to address the residual effect.

models must be calculated. Second, the intensity of use must be compared to the older, less-efficient models. If more-efficient appliances are larger or are used more, the energy savings accruing over a year will be less than the difference in efficiency of the two units. Finally, there is the possibility that the new device will replace the old one, but that the old device will be used elsewhere in the home; in the 2008 NRTEE report, this was denoted the *beer fridge effect*. In this case, the purchase of the new appliance will increase household energy consumption rather than reduce it (unless the household also replaces an even older beer fridge). The estimates provided for the emissions reductions from regulatory policies do an excellent job of accounting for the rate of capital turnover in the primary appliance stock; however, there is little evidence paid to whether the increased efficiency will result in greater numbers of the appliance being in use throughout the country or whether the number of appliances in secondary use will change.

A significant proportion of the reductions in 2012 are due to the introduction of an effective ban on incandescent light bulbs that will not be able to meet new standards for energy efficiency. In its 2007 Response, the NRTEE pointed out that estimates of 4.1 Mt of carbon-emissions reduction could only be achieved through a complete replacement of all light bulbs on January 1, 2012. This figure was adjusted in the 2008 Plan to reflect the longer period of capital turnover required to realize all of the reductions. In the 2009 Plan, the estimated emissions reductions have not changed significantly in this regard.

The estimates in the Plan also include the impacts of EnerGuide and ENERGY STAR labelling programs. Consumer awareness plays an important role in driving energy-conscious behaviour. Both EnerGuide and ENERGY STAR labels are household names in Canada, and Canadians do take these labels into account in purchasing decisions. To what degree they do so is speculative. NRCan has compiled survey evidence to suggest that labels account for energy savings equivalent to 30% of the effects of regulations. This estimate may be optimistic; as regulations get tighter, the impact of labels would likely decrease as most products on the market are at the higher-efficiency end of the spectrum. Of further concern is the fact that ENERGY STAR is an international labelling initiative. Natural Resources Canada promotes the international ENERGY STAR symbol in Canada and monitors its use. As such, it would be inaccurate to claim that all of the benefits of ENERGY STAR labels in the marketplace are due to the actions of NRCan. Reporting the benefits of separate programs — labelling and regulations — would increase transparency.

Conclusions

Given the fact that the estimates provided do not account for the rebound effect of increased intensity of use or increased total appliance stock through the beer-fridge effect, the projected gains from improved standards remain likely overestimates of actual reductions.

1.3 REGULATING RENEWABLE FUELS CONTENT

Table 6: Summary of Analysis for Regulating Renewable Fuels Content

Program	Projected Emissions Reductions in Mt					Key Determinants of Results	Predictive Accuracy
	2008	2009	2010	2011	2012		
Regulating Renewable Fuels Content	0	0	0.3	1	2.1	• renewable fuels' emissions reductions factor • import and export market • effects of U.S. LCFS	Undetermined

Summary of the Initiative and Emissions Projections

Regulations will require 5% renewable fuel content by volume for gasoline from 2010 and 2% by volume for diesel fuel and heating oil by no later than 2012. The estimates provided in the 2009 Plan are slightly higher for 2010, 2011, and 2012 relative to those reported in 2008.

Analysis

The projections in the 2009 Plan are derived by estimating incremental volumes of biodiesel and ethanol produced, and calculating emission reductions using conversion factors that specify the amount by which total GHG emissions are reduced when gasoline and diesel are produced from biomass rather than from petroleum. The 2008 Plan improved on the 2007 Plan to reflect only incremental volumes produced as a result of the regulation, and this improvement is again included in the 2009 Plan.

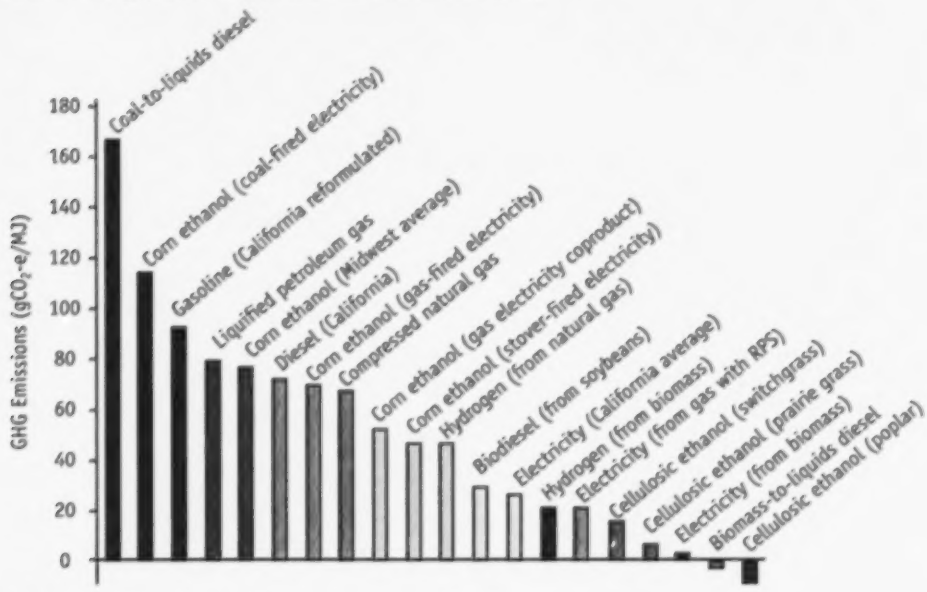
Three key sources of uncertainty surround the impact of this regulation. First, how the ethanol and biodiesel is produced will have a substantial impact on the emissions reductions. Second, where the ethanol and biodiesel is produced could have an impact. Finally, and perhaps most importantly, what effect the increase in ethanol and biodiesel has on domestic production of gasoline and diesel will determine the induced reductions. Each of these is discussed in turn below.

The emissions reduction factors used in the 2009 Plan suggest that ethanol and biodiesel production respectively lead to 33.1% and 66.5% reductions in GHG emissions relative to production of gasoline and diesel from fossil fuel sources. Over the past two years, many studies have compiled evidence to suggest that emissions reductions from biofuel production may not be as large as previously estimated, especially if induced indirect land use changes are tabulated in the estimates.[38, 39] Even without accounting for these indirect changes, it is clear from Figure 9 that the GHG emissions reductions will vary immensely depending on the source of the feedstock.

38 Indirect land use changes capture the potential that total agricultural land will increase in order to meet demand for biofuel feedstocks. Contrast with direct land use changes that centre on crop-switching to biofuel feedstocks from other agricultural production.

39 See Farrell et al. (2006), Liska et al. (2009), Hill et al. (2006), and Searchinger et al. (2008) for details on life-cycle emissions from biofuels and fossil fuels.

Figure 9: GHG Footprints of Traditional and Alternative Fuels[40]



Note: Beyond carbon we must examine:

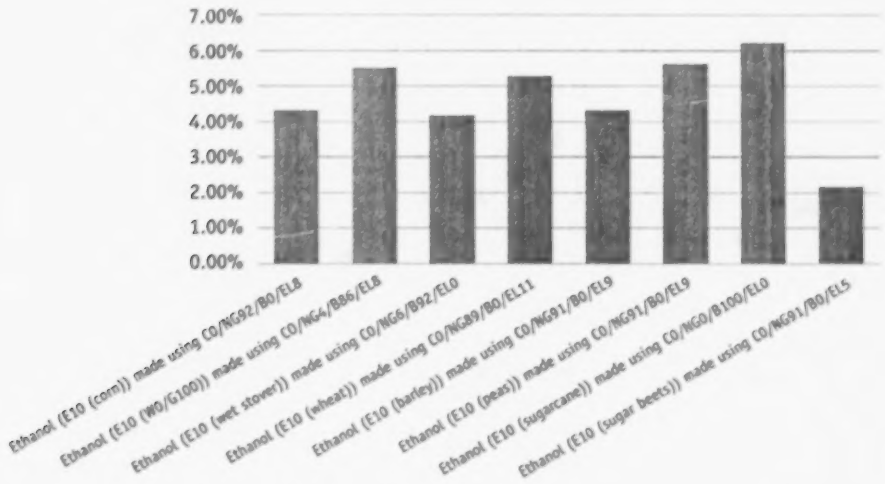
- water and nutrient demand
- compatibility with local practices
- food/fuel synergies, not competition

This discrepancy is also modelled in GHGenius, the model NRCan uses to calculate the potential emissions reductions from increases in ethanol and biodiesel production. Using data within the model, we can see the importance of the source of biofuel feedstock and the production techniques used in determining the emissions reductions. In Figure 10, a sample of these data are provided. They show, relative to crude-oil-sourced gasoline, that 10% ethanol fuel is likely to lead to overall emissions reductions, but not at the same rate for every technology or feedstock. In fact, some newer production technologies may lead to as much as a 90% emissions reduction relative to fossil fuel sources (see Growing Power Hairy Hill, http://www.Growingpower.com/, for example), while corn-based ethanol that uses coal-fired electricity to run the process is very likely to lead to higher overall emissions than gasoline. As such, the exact emissions reductions attributable to the regulation will only be known once the sources of all the ethanol and biodiesel consumed in Canada are known.

While the type of ethanol and biodiesel is important, where it is produced and the effect the ethanol production has on domestic refined-products industries will likely be more important. This is because Canada's emission inventory will only reflect the emissions from production and consumption of refined products that takes place in Canada. Even though most biofuel production has lower GHG emissions than comparable fossil-fuel-based production, the emissions from the process are still greater than zero. This implies that if

40 Kammen Laboratory at Berkeley, 2008. http://www.ametsoc.org/atmospolicy/documents/2008ESSS/ESSS42508/Kammen-AMS-biofuels-4-25-08.pdf

Figure 10: Predicted GHG Emissions Reductions using GHGenius Compared to Gasoline for 10% Ethanol Fuel



Note: The technology used to produce the ethanol will greatly alter the emissions reductions (by as much as 300%).[41]

ethanol and biodiesel productions increase, but production from fossil fuels remains constant, emissions on the production side will actually go up, not down. This is certainly a possible outcome since the market for refined products is reasonably integrated on a North American basis, and Canada currently exports over 300,000 barrels per day of gasoline. Increasing ethanol production in Canada combined with increased exports of fossil-fuel-derived gasoline would negate any positive effects on the emissions inventory and would likely imply an increase in emissions relative to business as usual.

The import-export market effect could also turn in the opposite direction. Given the ethanol and biodiesel requirement, it is possible that much of the incremental supply could be sourced through imports. Any U.S. or Brazilian ethanol production emissions would not be reflected in Canada's emissions inventory since they do not occur within Canada. Imported biofuels can therefore decrease Canada's emissions if these imports reduce Canadian refined products production levels below business as usual.

Recent changes to the import-export market may have significant implications for the overall impact of the Canadian biofuel standard. Some U.S. states including California have introduced low carbon fuel standards, and the California standard in particular contains an adverse treatment of first generation ethanol in the U.S.— the so-called "corn coal" ethanol. As regulations in the U.S. disadvantage some ethanol producers, regulations in Canada are creating a demand for ethanol

41 Generated using the GHGenius model.

in general; as a result it is very possible some of this U.S. produced "corn coal" ethanol will be exported to Canada. Importantly, the emissions inventories would not be adversely affected in Canada since all of the electricity for production and any induced land-use changes would be taking place in the U.S.

Conclusions

As in previous Plans, the key question with respect to the biofuels standard is the emissions reduction factor applied to the incremental volume of ethanol and biodiesel consumption in Canada. The figures used by NRCan may be either high or low depending on the eventual impact of the standard on biofuel production in Canada and the activity in the refined products sector in Canada. If the biofuel standard serves to increase production of biofuels in Canada but does not decrease conventional gasoline or diesel production at the same time (relative to business as usual), then the policy cannot be said to be decreasing emissions. Conversely, if the policy leads to increased imports of even the most emissions-intensive U.S. biofuels, this may have a more positive impact on Canada's emissions inventories (since production takes place elsewhere) as long as there is a corresponding decrease in the refining of conventional feedstock gasoline and diesel. As such, it is not possible to reach a conclusion on the Plan's estimate with respect to the impact of the renewable fuel content standard.

1.4 ECOENERGY FOR RENEWABLE POWER

Table 7: Summary of Analysis for ecoENERGY for Renewable Power

Program	Projected Emissions Reductions in Mt					Key Determinants of Results	Predictive Accuracy
	2008	2009	2010	2011	2012		
ecoENERGY for Renewable Power	2.2	3.7	5.5	6.7	6.7	• additionality • free-ridership	Likely over-estimate

Summary of the Initiative and Emissions Projections

The ecoENERGY for Renewable Power is the most recent of a series of incentive programs (previous programs were the Wind Power Production Incentive [WPPI] and the Renewable Power Production Incentive [RPPI]) that provides an incentive of one cent per kilowatt hour for up to 10 years to reduce the cost gap between new technologies and traditional sources of electricity.

Analysis

The estimates above have not changed from those provided in the 2007 or 2008 Plans, and so issues brought forward in the 2007 and 2008 NRTEE responses remain as well.

The emissions reductions are calculated by assuming that without the subsidy, none of the facilities receiving the payments would have been built. These estimates were calculated on the basis of renewable energy supplies of 4.7 TWh in 2008, 8.0 TWh in 2009, 11.7 TWh in 2010, and 14.3 TWh for 2011 and 2012, and the emissions reductions are derived using a conversion factor of 0.4564 Mt/TWh. These estimates do not represent the incremental energy generation caused by the subsidy program— rather these figures represent the total amount of generation occurring in projects financed by the subsidy program. The only case under which these numbers will be a completely accurate representation of the effect of the program is if none of the financed projects would have been built absent the subsidy.

The overestimate here is due to what we have previously defined as the free-rider problem associated with subsidies. According to NRCan (undated), "where a renewable electricity generation project is developed at a site where no previous electrical generation existed, it would clearly be considered 'incremental'." This does not, however, constitute an appropriate definition of incremental generation for the purposes of evaluating policy-induced emissions reduction. In order for emissions reductions to be clearly attributed to increased renewable generation under the RPPI, it must be demonstrable that either:

1. The production facility would not have been built absent the subsidy, and the new facility replaces an existing one with a higher rate of emissions; or,
2. The production facility would have been added absent the subsidy, but the facility would have been more emissions-intensive.

Discussions with NRCan for the purposes of this evaluation confirmed that all new renewable energy production eligible for financing under the RPPI would be considered as contributing to emissions reductions. This approach effectively ignores the potential for policy free-riders, who benefit by receiving the subsidy for projects which would have been built irrespective of it.

An important distinction must be made between policy design and policy evaluation. NRCan has made significant efforts to design the program to minimize free-ridership. Power projects for which rates of return exceed defined thresholds must return any subsidies paid to them, and the regulation does have a strict definition for incremental, renewable generation. However, this does not preclude a case where the subsidy is paid to a project that would have occurred even in the absence of the subsidy. This is an evaluation issue: if it is assumed that every financed project is caused by the subsidy, the subsidy will appear to be more effective on a GHG reductions-per-dollar basis than it actually is, and the role that the policy will play in moving Canada away from its business as usual forecast will be lower than predicted.

Conclusions

The sources of overestimation cited in the 2007 and 2008 NRTEE responses remain in the 2009 Plan for this program. Figures in the Plan do not fully represent incremental reductions in GHG emissions that will occur as a result of the policy. Rather, they represent an estimate of the difference in emissions occurring as a result of all government-financed renewable power in Canada, assuming that none of this would have been built absent the subsidies, and that the same amount of power generation would have been built using an average mix of generation fuels (i.e. gas, coal, hydro). While some emission reductions will occur due to this initiative, the amount stated in the Plan is a likely overestimate.

1.5 ECOENERGY FOR BUILDINGS AND HOUSES

Table 8: Summary of Analysis for ecoENERGY for Buildings and Houses

Program	Projected Emissions Reductions in Mt					Key Determinants of Results	Predictive Accuracy
	2008	2009	2010	2011	2012		
ecoENERGY for Buildings and Houses	0.32	0.56	1.13	1.57	2.02	• program offers information, while estimated reductions are based on significant regulatory changes	Likely over-estimate

Summary of the Initiative

The ecoENERGY for Buildings and Houses program is an information-based initiative offering training, labelling, and rating of houses and buildings. The estimates for this program are unchanged from 2008.

Analysis

The bulk of forecasted emissions reductions attributed to this program come through assumed changes in commercial building codes driven through the adoption of a non-binding Updated Model National Energy Code for Buildings (MNECB) and through the impacts of disseminating energy-efficient home building practices through labelling.

The current National Model Energy Code for Buildings was published in 1997. Since then, provinces or municipalities have adopted measures that are recommended in this publication. In documentation supporting the 2009 Plan, NRCan stipulates that the emissions reductions attributed to the building code amendments require all provinces and jurisdictions in Canada to adopt the Updated MNECB by 2010/2011 or to amend the National Model Energy Code. According to the NRCan website for the National Model Energy Code, "the next edition of the MNECB is scheduled to be released in 2011." On an NRCan website devoted to the adoption of national building, fire, and plumbing codes, it is clear that the Model Energy Code was not directly adopted on a wide scale.[42] In fact, the National Model Energy Code is only mentioned once on the site, in a phrase that says, "Ontario also references the Model National Energy Code for Buildings in its building code."

However, evidence does exist that provinces may actually be ahead of the national code. In the 2008 Plan, details were provided indicating that four provinces are currently running pilot projects relating to the building code, while six have announced changes to the building code to require an EnerGuide rating of 80 — the EnerGuide labelling standard recommended in the Updated Model National Energy Code for Buildings that will only be published in 2011. Some provinces are enacting building code changes as part of their climate-change policies. For example, in Nova Scotia, new homes would be required to **display** an EnerGuide rating by 2008, while minimum standards would require a rating of 72 by 2009, 77 by 2010, and 80 by 2011.

This analysis raises some concerns with respect to the attribution of emissions reductions. First, major changes to the building code requiring an immediate implementation of EnerGuide 80 ratings are not likely to be in place in all jurisdictions by 2008–2012, and so the assumptions underlying the analysis are likely optimistic.

42 See http://www.nationalcodes.ca/ncd_model-code_e.shtml

Second, even if the regulatory changes were to be made, it would be difficult to directly attribute the emissions reductions resulting from these changes to a program that provides guidance, but does not enforce the regulation, especially as evidence suggests that the National Code may follow provincial action, rather than the other way around. Finally, impacts resulting from provincial-level policy changes should also be omitted from policy-by-policy analysis of a federal program.

A second source of emissions reductions in the calculation is subject to concerns of additionality. Labelling of houses with respect both the R-2000 Standard and EnerGuide Rating System is handled under this program. Information provided to the NRTEE by NRCan states that in order to calculate energy savings from the aspect of the program, "the expected energy savings per house are calculated by comparing the energy consumption of code-compliant average new construction with the energy consumption of rated houses under the two categories of labelling for energy efficient new homes (i.e., R-2000 and EnerGuide Rating System). Data…show that a basic EnerGuide-labelled new house saves an average 33 GJ per year over conventional new construction …and an R-2000-labelled house (average EnerGuide rating 82) saves 60 GJ per year compared to conventional new construction. To obtain the total energy savings, the savings per house described above is then multiplied by the number of houses expected to be built."[43]

This approach implicitly assumes that, absent the administration of the labelling program, no houses would be built to higher levels of energy efficiency. Attributing the effect of all new, energy efficient construction to a program that provides a particular label and standard is likely to overestimate the induced emissions reductions.

Conclusions

The assumptions made by NRCan for evaluation of this program are likely to lead to an overestimate of the program's impact. While the program provides information and labelling, the estimated emissions reductions are based in part on significant changes to building codes being implemented in all provinces. Some provinces have changed or will change current building codes to include more stringent requirements based on the EnerGuide labelling system; however, the existence of the labels and associated information has not necessarily led to all of these changes. Further, the program attributes energy savings from all new homes built to R-2000 standards to the program, which does not account for the possibility that some houses are built to higher standards of energy efficiency due to other factors such as high energy prices. The estimated impacts thus likely overestimate the impact of this labelling, training, and information program.

43 Canada, 2009a.

1.6 ECOENERGY RETROFIT INITIATIVE

Table 9: Summary of Analysis for ecoENERGY Retrofit Initiative

Program	Projected Emissions Reductions in Mt					Key Determinants of Results	Predictive Accuracy
	2008	2009	2010	2011	2012		
ecoENERGY Retrofit	0.46	0.67	1.2	1.66	1.66	• treatment of free-ridership • conversion of predicted energy savings to realized emissions reductions • rebound effect	Likely over-estimate

Summary of the Initiative and Emissions Projections

The ecoENERGY Retrofit Initiative offers subsidies to owners of homes and small- to medium-sized businesses upon completion of retrofits that verifiably improve the energy-efficiency rating of the building. The Plan projects reductions resulting from this program of 440 kt in 2008 up to 1 Mt in 2012, or roughly 250 kt per cumulative-program-year of emissions savings. These estimates have increased from those published in the 2007 and 2008 Plans. The additional emissions reductions are expected due to an allocation of additional funds under the 2009 federal budget, but the estimation techniques rely on the same methodology.

Analysis

Reductions are calculated based on differences between the forecasted energy consumption with and without all retrofits financed through the program. According to information provided by NRCan for the purposes of this evaluation, forecast energy savings are based on realized energy audits from past programs that are then converted to emissions savings using emissions factors.

Free-ridership is the key source of concern with the forecasted effects of this policy. The retrofit grants explicitly fund any Canadian who chooses to undertake a qualifying renovation and who is willing to pay for the initial and final energy audits. This decision would be made on the basis of whether the expected subsidy payment is large enough to justify the cost and inconvenience of the audit. NRCan has stated that "when designing its ecoENERGY programs, NRCan addressed free ridership by setting hurdle rates for program participants and requiring significant investment on the part of the individual. These program requirements substantially reduce the potential for free ridership."[44] This condition actually increases the probability of free-ridership. If a program only pays for a very small part of a home renovation, it is unlikely that the subsidy drives the renovation, but rather it rewards the decision after the fact. If a homeowner has to undertake a $15,000 renovation to obtain a $1000 grant, it is unlikely that all renovations are the direct result of the grant program.

The way in which emissions reductions are calculated for the ecoENERGY Retrofit Initiative highlights the issue of free-ridership. While a substantial portion of the retrofit is financed by the homeowner, the energy savings are calculated on the basis of energy audits performed before and after all renovations are complete. While the grant only provides a portion of the funding, all of the

44 Canada, 2009a.

savings are attributed to the grant — effectively a leveraged buyout of the emissions reductions. The implicit assumption is that none of the improvements would have happened absent the incentive program. While not ideal, a potential way to improve these estimates would be to look at the total cost of all renovations undertaken in order to qualify for grants, and pro-rate the emissions reductions to account only for the proportion of the total renovation (or the proportion of specific components) paid for by the grant. It will be difficult to come up with a measure of the degree of free-ridership directly, as people who have received a grant cheque are unlikely to answer that it had no role in them undertaking the renovation for fear of clawbacks.[45]

In previous KPIA responses, the NRTEE has cited evidence that the level of free-ridership may lie between 40 and 80% of subsidy recipients. To avoid double-counting of emissions reductions that would have occurred absent the program, an adjustment factor reflecting the amount of the retrofits projected to be incremental should be added to the estimates. For example, in estimates of the contribution of the ecoAUTO subsidies, Transport Canada accounts for the free-rider problem by assuming that 60% of forecast increases in efficient vehicle sales cannot be directly attributed to the rebates. Similarly, a survey of recipients of the U.S. Conservation Tax Credit, a subsidy designed to encourage homeowners to invest in energy efficiency, cited in previous NRTEE responses indicated that as many as 90% would have undertaken home renovations with or without the tax incentive.

An issue that was also raised in the 2007 NRTEE Response is the fact that retrofit subsidies reward efficiency, not diminished total energy consumption. In fact, they may provide an incentive to increase the intensity of use or the total number of certain energy durables (through the rebound effect). NRCan documentation states that these effects are generally small, which is true — but they are not zero either. The 2007 NRTEE Response highlighted a study by Dubin, Miedema, and Chandran (1986) that showed that, for a similar program, actual energy savings from the installation of new cooling technologies would be as much as 13% below engineering estimates on average. For heating, energy savings 8–12% below engineering estimates were found.

Combining these two effects will likely mean that emissions reductions reported here will be overestimated. As NRCan relies extensively on its previous program evidence, it bears mentioning again (as in the NRTEE 2007 and 2008 responses) that for a previous similar NRCan program, predicted emissions savings resulting from renovations was 4 tonnes, while the average realized emissions savings was found to be 1.4 tonnes per household, or less than half of the predicted savings at the time.[46]

An issue not addressed in the 2009 Plan is the introduction in the 2009 federal budget of the Home Renovation Tax Credit. Interestingly, while this program provides an incentive for homeowners to undertake renovations (some of which will likely be incremental to business as usual), some of these renovations will likely include energy efficiency improvements that would not have occurred otherwise. The Tax Credit combined with the ecoENERGY for Retrofits and some matching provincial and municipal programs may add a compelling incentive for families to improve the energy efficiency and reduce the energy consumption of their dwellings. Both the Tax Credit and any interactions with the ecoENERGY for Retrofits and other programs should have been assessed.

Conclusions

The estimates in the 2009 Plan claim all of the energy savings from all retrofits receiving financing. The implicit assumption is that all of these retrofits occur because of the subsidy — that there are no free riders. Further, the estimates in the Plan directly translate forecasted energy-efficiency gains into emissions reductions, without explicitly accounting for rebound effects. The resulting emissions reductions will therefore likely be overestimated.

45 Importantly, in the ecoENERGY for Renewable Power program, there are significant efforts applied at the design stage to discourage free-ridership. There are no such clawbacks or limitations on funding from the ecoENERGY for Retrofits Initiative – anyone performing a qualifying renovation is eligible to receive the subsidy.

46 Canada, 2006b.

1.7 ECOMOBILITY INITIATIVE

Table 10: Summary of Analysis for ecoMOBILITY Initiative

Program	Projected Emissions Reductions in Mt					Key Determinants of Results	Predictive Accuracy
	2008	2009	2010	2011	2012		
ecoMOBILITY Initiative	0	0	0.11	0.11	0.11	• Emissions reductions no longer based on effects of more aggressive disincentive policies, but impact of this information program may still be optimistic	Likely over-estimate (though improved from 2008)

Summary of the Initiative

The ecoMOBILITY program is an information program designed to increase municipal capacity to combine transportation demand-management policies, programs, and services with major infrastructure investments under federal infrastructure funding initiative. The program is assessed here even though small emissions reductions are attributed to it because the emissions reductions attributed to it have changed significantly in 2009.

Analysis

In its response to the 2008 Plan, the NRTEE found that the impact of this program was overestimated since it was assumed that the information provided would reduce the vehicle kilometres travelled (VKT) by passenger vehicles in urban areas by 3% by 2010. The model scenario used to justify the 3% measure was based specifically on disincentives, not information programs, and provided the following examples of policies:

- Parking management
  - Limited supply of long-term parking
  - Higher and more extensive parking charges
- Road pricing (i.e., tolls)
- Institutional measures
- Trip reduction bylaws
- Bicycle parking bylaws
- Distance-based vehicle insurance
- Taxes and fees on vehicle ownership
- Fuel taxes

Documentation provided by Transport Canada suggests that the 2009 Estimates were reduced significantly (assumed reductions in VKT changed from 3% to 0.2%) because "the current program approach to focus on a narrower range of non-transit-based TDM strategies will necessarily lower GHG emission reductions that will be attributable to the program in 2012." Even the low-TDM scenarios in the publication cited by Transport Canada[47] assume significant

47 Canada, 2005.

intervention and funding. This program does not likely have the budget or the scope to affect vehicle use decisions in each municipality in Canada and so, while demonstration projects show promising results, significant budget outlays would be required to implement these programs on a large scale and achieve the estimated emissions reductions.

Conclusions

The 3% reduction attributed to the 2008 Plan was likely overly optimistic, and Transport Canada has adjusted the measures accordingly in 2009. At the level of precision of this analysis, some overestimates likely remain. The program must still accomplish the equivalent of removing one vehicle out of 500 off the road, which is unlikely to occur through information provision. In future, estimates for such programs should only include actions directly attributed to the information provided, and should perhaps use greater caution when equating information provision with either incentives or disincentives provided through financial or regulatory programs.

1.8 ECOFREIGHT PROGRAM

Table 11: Summary of Analysis for ecoFREIGHT Program

Program	Projected Emissions Reductions in Mt					Key Determinants of Results	Predictive Accuracy
	2008	2009	2010	2011	2012		
ecoFREIGHT Program	0	0.98	1.12	1.25	1.37	• many of the changes likely made in response to EPA regulations, not Canadian government programs • no accounting for additionality, unlike other Transport Canada programs	Likely over-estimate

Summary of the Initiative

The ecoFREIGHT program is a catch-all for a set of voluntary initiatives described as programs that build and maintain partnerships within the transportation sector. Included in the program are Memoranda of Understanding between the rail and air freight industry associations with respect to greenhouse gas emissions reductions.

Analysis

There are two contributors to the emissions reductions attributed to ecoFREIGHT. First, the estimates include direct and indirect impacts of funded pilot or demonstration projects. The definitions used are that the direct impacts are the reductions in emissions associated with the funded adoption of a new technology, while the indirect impacts are those associated with the penetration of the technology into the marketplace after the demonstration. Two concerns arise here. First, as with other project-based-funding programs, the question of free-ridership arises. One must ask whether any of the funded technologies would have been adopted by program participants absent the funding (free riders erode the direct impacts). Unlike other program-impact estimates in the Plan, the ecoFREIGHT program also supposes that future market penetration of the new technologies is due to the financed demonstration projects. Again, it is important to estimate the incremental portion of these adoption decisions due to the program. It would be more effective to examine other jurisdictions where similar programs are not in place in order to estimate the increase in market penetration in Canada relative to other locations with similar fuel prices.

The second portion of emissions reductions attributed to this program is due to Memoranda of Understanding (MOU) adopted between the federal government and the air and rail transportation industries. The NRTEE has previously outlined concerns with the attribution of emissions reductions to these MOUs given that the definition of emissions reductions used is "reductions relative to business as usual." In order to assess these MOUs, several questions should be asked. First, would

regulations in the U.S. lead to similar emissions reductions in Canada with or without the MOU in place? Given the importance of freight traffic between the U.S. and Canada, producers will follow the regulations put forward in both jurisdictions in order to ensure continued access to both markets. In the case of the rail MOU, the NRTEE has pointed out in the past that the terms of the MOU exactly mirror new EPA guidelines in the U.S.[48] Under the MOU, Canadian freight transporters agree to meet regulations they would likely meet absent the MOU, and so few incremental emissions reductions should be attributed to this measure. The second question, related to the incrementality of emissions reductions, is whether the emissions reductions would have occurred absent the MOU due to other drivers. This is likely the case in the air travel sector, where newer, more efficient airplanes are cheaper to operate, can cover longer distances, and also lead to reduced GHG emissions. The first two drivers are likely more important to their adoption than the third, and so one can suppose that the airplanes would have been adopted absent the MOU between the air industry and the government. In order to assess the role of the MOU, it must again be asked whether differences are observed with respect to emissions reductions in Canada versus other similar jurisdictions, not simply whether air travel in Canada is becoming more efficient.

Conclusions

Evaluating impacts of information and voluntary programs is very difficult. In either case, determining the incremental impact of the program requires strong assumptions about what would have happened absent the program, as specific actions are neither incented through subsidies, disincented through fees, or forced through regulation. The standard for attributing emissions reductions to voluntary or information programs should be the provision of clear evidence that the actions taken would not have happened absent the program, and to the best of our analysis, that is not provided here.

48 United States Environmental Protection Agency (EPA), 2008.

1.9 CLEAN AIR AND CLIMATE CHANGE TRUST FUND

The 2009 Plan maintains the 2007 and 2008 estimate that $1.519 billion provided by the federal government to the provinces and territories through the Clean Air and Climate Change Trust Fund (CACC Trust) should generate emission reductions of 16 Mt per year for the years 2008–2012.

These estimates, based on information provided in 2007, were derived from the projected rate of emissions reductions per dollar in Quebec. The Government of Quebec's June 2006 climate-change plan credited federal funding of $328 million with generating 3.8 Mt of emissions reductions per year. According to Environment Canada, "it was assumed that the tonne per $ reduction estimated by the Government of Quebec would hold (approximately) for projects in other provinces (3.8 Mt/$328 million = 0.012 tonne per $). Applying this factor to the $1.519 billion the federal government has provided provinces and territories through the CACC Trust, generates an emission reductions estimate of 17.6 Mt." As provincial policies play a key role in contributing to the national emissions reductions, understanding the role of all provincial measures is important.

There are two key issues with respect to the reporting of emissions reductions for the CACC Trust. First, as it is a trust fund, the federal government has no direct control over the measures implemented at the provincial level, nor can it enforce the emissions reductions. Second, and more important, many of the provincial measures are now included in the Environment Canada Projected Emissions Excluding Government Measures trajectory — the business as usual scenario. The Plan acknowledges these issues, suggesting, "Since the federal Government does not determine precisely how these funds are used, there is an intrinsic uncertainty in calculating the number of reductions expected to result from the Trust Fund."[49]

There is confusion about how the CACC Trust can be generating 16Mt of emissions reductions while the 2009 Plan states, "measures presented in this Plan — including both federal measures and provincial/territorial measures — emissions levels are expected to be about 1 Mt below the baseline." This is the issue of what is and is not included in the baseline. There is an important tension here between properly attributing emissions reductions to the federal funding flowing to the provinces and the double-counting of these initiatives.

Conclusions

Given the nature of the CACC Trust and the lack of attributable detailed information and methodologies from provincial and territorial governments, it will likely not be possible to attribute specific emissions reductions to the funding provided to the provinces. It is important to note that no province has the same public reporting obligation as the federal government has been given by Parliament. In future, it would be more informative to establish a baseline that includes provincial programs launched before a cut-off date (January 1, 2006 is used in the current Environment Canada Reference Case) and to provide an estimate of the impact of specific provincial measures generated through the integrated modelling within the E3MC framework. While this approach is not perfect, it will certainly add a greater degree of transparency to the current method of reporting for the CACC Trust.

49 Canada, 2009a, p. 28.

APPENDIX B:
KYOTO PROTOCOL IMPLEMENTATION ACT

Department of Justice Canada | Ministère de la Justice Canada

Canada

Kyoto Protocol Implementation Act (2007, c. 30)
Disclaimer: This document is not the official version.
Act current to September 21st, 2007
Attention: See coming into force provision and notes, where applicable.

Kyoto Protocol Implementation Act

2007, c. 30

K-9.5

[Assented to June 22nd, 2007]

An Act to ensure Canada meets its global climate change obligations under the Kyoto Protocol

Preamble

Recognizing that

Canadians have a deep pride in their natural environment, and in being responsible stewards of their land,

Canada is committed to the principle of environmentally sustainable development,

a healthy economy and a healthy society depend on a healthy environment,

Canadians want to take responsibility for their environmental problems, and not pass those problems on to future generations,

global climate change is one of the most serious threats facing humanity and Canada, and poses significant risks to our environment, economy, society and human health,

the national science academies of Canada, Brazil, China, France, Germany, India, Italy, Japan, Russia, the United Kingdom and the United States declared the following in June 2005: "The scientific understanding of climate change is now sufficiently clear to justify nations taking prompt action. It is vital that all nations identify cost-effective steps that they can take now, to contribute to substantial and long-term reduction in net global greenhouse gas emissions.",

climate change is a global problem that crosses national borders,

Canada has a clear responsibility to take action on climate change, given that our per capita greenhouse gas emissions and wealth are among the highest in the world, and that some of the most severe impacts of climate change are already unfolding in Canada, particularly in the Arctic,

the objective of the United Nations Framework Convention on Climate Change (UNFCCC) is "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system",

Canada has ratified the UNFCCC, which entered into force in 1994,

the Kyoto Protocol requires that Canada reduce its average annual greenhouse gas emissions during the period 2008-2012 to six per cent below their level in 1990,

Canada ratified the Kyoto Protocol in 2002 following a majority vote in Parliament, and the Protocol entered into force in 2005,

this legislation is intended to meet, in part, Canada's obligations under the UNFCCC and the Kyoto Protocol, and

the problem of climate change requires immediate action by all governments in Canada as well as by corporations and individual Canadians,

NOW, THEREFORE, Her Majesty, by and with the advice and consent of the Senate and House of Commons of Canada enacts as follows:

SHORT TITLE

Short title

1. This Act may be cited as the Kyoto Protocol Implementation Act.

INTERPRETATION

Definitions

2. The definitions in this section apply in this Act.

"Climate Change Plan"
«*Plan sur les changements climatiques* »

"Climate Change Plan" means a plan that meets the conditions set out in section 5.

"greenhouse gas"
«*gaz à effet de serre* »

"greenhouse gas" means one of the greenhouse gases listed in Annex A to the Kyoto Protocol.

"Kyoto Protocol"
«*Protocole de Kyoto* »

"Kyoto Protocol" means the Kyoto Protocol to the United Nations Framework Convention on Climate Change, agreed to on December 11, 1997 at Kyoto, Japan, and ratified by Canada on December 17, 2002, as amended from time to time, to the extent that the amendment is binding on Canada.

"Minister"
«*ministre* »

"Minister" means the Minister of the Environment.

PURPOSE

Purpose

3. The purpose of this Act is to ensure that Canada takes effective and timely action to meet its obligations under the Kyoto Protocol and help address the problem of global climate change.

HER MAJESTY

Binding on Her Majesty

4. This Act is binding on Her Majesty in Right of Canada.

CLIMATE CHANGE PLAN

Climate Change Plan

5. (1) Within 60 days after this Act comes into force and not later than May 31 of every year thereafter until 2013, the Minister shall prepare a Climate Change Plan that includes

(a) a description of the measures to be taken to ensure that Canada meets its obligations under Article 3, paragraph 1, of the Kyoto Protocol, including measures respecting

(i) regulated emission limits and performance standards,

(ii) market-based mechanisms such as emissions trading or offsets,

(iii) spending or fiscal measures or incentives,

(iii.1) a just transition for workers affected by greenhouse gas emission reductions, and

(iv) cooperative measures or agreements with provinces, territories or other governments;

(b) for each measure referred to in paragraph (a),

(i) the date on which it will come into effect, and

(ii) the amount of greenhouse gas emission reductions that have resulted or are expected to result for each year up to and including 2012, compared to the levels in the most recently available emission inventory for Canada;

(c) the projected greenhouse gas emission level in Canada for each year from 2008 to 2012, taking into account the measures referred to in paragraph (a), and a comparison of those levels with Canada's obligations under Article 3, paragraph 1, of the Kyoto Protocol;

(d) an equitable distribution of greenhouse gas emission reduction levels among the sectors of the economy that contribute to greenhouse gas emissions;

(e) a report describing the implementation of the Climate Change Plan for the previous calendar year; and

(f) a statement indicating whether each measure proposed in the Climate Change Plan for the previous calendar year has been implemented by the date projected in the Plan and, if not, an explanation of the reason why the measure was not implemented and how that failure has been or will be redressed.

Provinces

(2) A Climate Change Plan shall respect provincial jurisdiction and take into account the relative greenhouse gas emission levels of provinces.

Publication

(3) The Minister shall publish

(a) within 2 days after the expiry of each period referred to in subsection (1), a Climate Change Plan in any manner the Minister considers appropriate, with an indication that persons may submit comments about the Plan to the Minister within 30 days of the Plan's publication; and

(b) within 10 days after the expiry of each period referred to in subsection (1), a notice of the publication of the Plan in the *Canada Gazette*.

Tabling

(4) The Minister shall table each Climate Change Plan in each House of Parliament by the day set out in subsection (1) or on any of the first three days on which that House is sitting after that day.

Committee

(5) A Climate Change Plan that is laid before the House of Commons is deemed to be referred to the standing committee of the House that normally considers matters relating to the environment or to any other committee that that House may designate for the purposes of this section.

REGULATIONS

Regulations

6. (1) The Governor in Council may make regulations

(a) limiting the amount of greenhouse gases that may be released into the environment;

(a.1) within the limits of federal constitutional authority, limiting the amount of greenhouse gases that may be released in each province by applying to each province Article 3, paragraphs 1, 3, 4, 7, 8, and 10 to 12, of the Kyoto Protocol, with any modifications that the circumstances require;

(b) establishing performance standards designed to limit greenhouse gas emissions;

(c) respecting the use or production of any equipment, technology, fuel, vehicle or process in order to limit greenhouse gas emissions;

(d) respecting permits or approvals for the release of any greenhouse gas;

(e) respecting trading in greenhouse gas emission reductions, removals, permits, credits, or other units;

(f) respecting monitoring, inspections, investigations, reporting, enforcement, penalties or other matters to promote compliance with regulations made under this Act;

(g) designating the contravention of a provision or class of provisions of the regulations by a person or class of persons as an offence punishable by indictment or on summary conviction and prescribing, for a person or class of persons, the amount of the fine and imprisonment for the offence; and

(h) respecting any other matter that is necessary to carry out the purposes of this Act.

Measures province considers appropriate

(2) Despite paragraph (1)(a.1), and for greater certainty, each province may take any measure that it considers appropriate to limit greenhouse gas emissions.

Obligation to implement Kyoto Protocol

7. (1) Within 180 days after this Act comes into force, the Governor in Council shall ensure that Canada fully meets its obligations under Article 3, paragraph 1, of the Kyoto Protocol by making, amending or repealing the necessary regulations under this or any other Act.

Obligation to maintain implementation of Kyoto Protocol

(2) At all times after the period referred to in subsection (1), the Governor in Council shall ensure that Canada fully meets its obligations under Article 3, paragraph 1, of the Kyoto Protocol by making, amending or repealing the necessary regulations under this or any other Act.

Other governmental measures

(3) In ensuring that Canada fully meets its obligations under Article 3, paragraph 1, of the Kyoto Protocol, pursuant to subsections (1) and (2), the Governor in Council may take into account any reductions in greenhouse gas emissions that are reasonably expected to result from the implementation of other governmental measures, including spending and federal-provincial agreements.

Consultation for proposed regulations

8. At least 60 days before making a regulation under this Act or, with respect to subsections 7(1) and (2), any other Act, the Governor in Council shall publish the proposed regulation in the Canada Gazette for consultation purposes with statements:

(a) setting out the greenhouse gas emission reductions that are reasonably expected to result from the regulation for every year it will be in force, up to and including 2012; and

(b) indicating that persons may submit comments to the Minister within 30 days after the publication of the regulation.

EXPECTED REDUCTIONS

Minister's statement

9. (1) Within 120 days after this Act comes into force, the Minister shall prepare a statement setting out the greenhouse gas emission reductions that are reasonably expected to result for each year up to and including 2012 from

(a) each regulation made or to be made to ensure that Canada fully meets its obligations under Article 3, paragraph 1, of the Kyoto Protocol, pursuant to subsections 7(1) and (2); and

(b) each measure referred to in subsection 7(3).

Minister

(2) The Minister shall

(a) publish the statement in the Canada Gazette and in any other manner that the Minister considers appropriate within 10 days of the period set out in subsection (1); and

(b) table the statement in each House of Parliament by the day set out in subsection (1) or on any of the first three days on which that House is sitting after that day.

REPORT

National Round Table on the Environment and the Economy

10. (1) Within 60 days after the Minister publishes a Climate Change Plan under subsection 5(3), or within 30 days after the Minister publishes a statement under subsection 9(2), the National Round Table on the Environment and the Economy established by section 3 of the *National Round Table on the Environment and the Economy Act* shall perform the following with respect to the Plan or statement:

(a) undertake research and gather information and analyses on the Plan or statement in the context of sustainable development; and

(b) advise the Minister on issues that are within its purpose, as set out in section 4 of the *National Round Table on the Environment and the Economy Act*, including the following, to the extent that they are within that purpose:

(i) the likelihood that each of the proposed measures or regulations will achieve the emission reductions projected in the Plan or statement,

(ii) the likelihood that the proposed measures or regulations will enable Canada to meet its obligations under Article 3, paragraph 1, of the Kyoto Protocol, and

(iii) any other matters that the Round Table considers relevant.

Minister

(2) The Minister shall

(a) within three days after receiving the advice referred to in paragraph (1)(b):

(i) publish it in any manner that the Minister considers appropriate, and

(ii) submit it to the Speakers of the Senate and the House of Commons and the Speakers shall table it in their respective Houses on any of the first three days on which that House is sitting after the day on which the Speaker receives the advice; and

(b) within 10 days after receiving the advice, publish a notice in the *Canada Gazette* setting out how the advice was published and how a copy of the publication may be obtained.

Commissioner of the Environment and Sustainable Development

10.1 (1) At least once every two years after this Act comes into force, up to and including 2012, the Commissioner of the Environment and Sustainable Development shall prepare a report that includes

(a) an analysis of Canada's progress in implementing the Climate Change Plans;

(b) an analysis of Canada's progress in meeting its obligations under Article 3, paragraph 1, of the Kyoto Protocol; and

(c) any observations and recommendations on any matter that the Commissioner considers relevant.

Publication of report

(2) The Commissioner shall publish the report in any manner the Commissioner considers appropriate within the period referred to in subsection (1).

Report to the House of Commons

(3) The Commissioner shall submit the report to the Speaker of the House of Commons on or before the day it is published, and the Speaker shall table the report in the House on any of the first three days on which that House is sitting after the Speaker receives it.

OFFENCES AND PENALTIES

Offences

11. (1) Every person who contravenes a regulation made under this Act is guilty of an offence punishable by indictment or on summary conviction, as prescribed by the regulations, and liable to a fine or to imprisonment as prescribed by the regulations.

Subsequent offence

(2) If a person is convicted of an offence a subsequent time, the amount of the fine for the subsequent offence may, despite the regulations, be double the amount set out in the regulations.

Continuing offence

(3) A person who commits or continues an offence on more than one day is liable to be convicted for a separate offence for each day on which the offence is committed or continued.

Additional fine

(4) If a person is convicted of an offence and the court is satisfied that monetary benefits accrued to the person as a result of the commission of the offence, the court may order the person to pay an additional fine in an amount equal to the court's estimation of the amount of the monetary benefits, which additional fine may exceed the maximum amount of any fine that may otherwise be imposed under the regulations.

Officers, etc., of corporations

(5) If a corporation commits an offence, any officer, director, agent or mandatory of the corporation who directed, authorized, assented to, or acquiesced or participated in, the commission of the offence is a party to and guilty of the offence and is liable on conviction to the punishment provided for the offence, whether or not the corporation has been prosecuted or convicted.

Offences by employees or agents

(6) In any prosecution for an offence, the accused may be convicted of the offence if it is established that it was committed by an employee, agent or mandatory of the accused, whether or not the employee, agent or mandatory has been prosecuted for the offence.

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